VPDES PERMIT FACT SHEET

This document gives pertinent information concerning the reissuance of the VPDES permit listed below. This permit is being processed as a major, industrial permit. The effluent limitations contained in this permit will maintain the Water Quality Standards of 9 VAC 25-260 et seq. The discharge results from the production of polyester resin and film. This permit action consists of updating special conditions and effluent limitations and monitoring. It also approves the proposed treatment and discharge of rinse and purge water from onsite groundwater sampling activities under RCRA Corrective Action. With this permit reissuance, the rinse and purge water is approved to be treated at the Industrial WWTP and discharged through internal outfall 101 and ultimately external outfall 001.

1. Facility Name and Address: DuPont Teijin Films
P.O. Box 411
Hopewell, VA 23860

Location: 3600 Discovery Drive
Chesterfield County

SIC Code: 3081 – Polyester Film Manufacture
2821 – Polyester Polymer Resin Manufacture

2. Permit No. VA0003077 Expiration Date: March 21, 2011

3. Owner: Du Pont Teijin Films U.S. Limited Partnership (DBA DuPont Teijin Films)
Contact: Joseph S. Bourne, Plant Manager
804-530-9397
Joseph.S.Bourne@usa.dupont.com

Permit/Facility Contact: Marianne Andrews, Environmental Engineer
804-530-9831
Marianne.R.Andrews@usa.dupont.com

4. Application Date: September 23, 2010
Permit Drafted By: E. Carpenter Date: January 24, 2011
DEQ Regional Office: Piedmont Regional Office
Reviewed By: Tamira Cohen Date: 1/31/11
Curtis Linderman Date: 2/15/11
Kyle Winter Date: 4/13/11
Heather Horne Date: 4/13/11
Public Comment Period Dates: 7/30/11 to 8/29/11
Receiving Waters Classification:

OUTFALLS	001	002	003	004	901
Receiving Stream	James River	James River	James River	James River	James River
Lat/Lon	37° 21' 05"; -77° 17' 32"	37° 21' 04"; -77° 17' 33"	37° 27' 08"; -77° 17' 30"	37° 21' 08"; -77° 17' 30"	37° 21' 05"; -77° 17' 32"
Basin	James River (Lower)	James River (Lower)	James River (Lower)	James River (Lower)	James River (Lower)
Subbasin	NA	NA	NA	NA	NA
Section	1o	1o	1o	1o	1o
Class	II	II	II	II	II
Special Standards	PWS	PWS	PWS	PWS	PWS

OUTFALLS	001	002	003	004	901
River Mile	2-JMS086.36	2-JMS086.40	2-JMS086.25	2-JMS086.25	2-JMS086.36
Tidal*	Yes	Yes	Yes	Yes	Yes
303(d) list	Yes Category 5A**	Yes Category 5A**	Yes Category 5A**	Yes Category 5A**	Yes Category 5A**

*The James River is tidally influenced at the discharge points. Flow frequencies cannot be determined for tidal waters; therefore, the previously determined dilution ratios should continue to be used to evaluate the effluent's impact on the water body.
** Category 5A means that a Water Quality Standard is not attained. The water is impaired or threatened for one or more designated uses by a pollutant(s) and requires a TMDL (303(d) list).
See **Attachment A** for Flow Frequency Memo**.**

6. Operator License Requirements: The recommended attendance hours by a licensed operator and the minimum daily hours that the treatment works should be manned by operating staff are contained in the Sewage Collection and Treatment (SCAT) Regulations 9VAC 25-790 et seq. A Class IV licensed operator is required for the sewage treatment plant. Although, the SCAT regulations are not applicable to industrial wastewater treatment plants, a Class III licensed operator was required for the process wastewater treatment plant in the 2006 permit. It is the permit writer's best professional judgment (BPJ) to carry forward this requirement in the permit reissuance.

7. Reliability Class: Reliability is a measurement of the ability of a component or system to perform its designated function without failure or interruption of service. The reliability classification is based on the water quality and public health consequences of a component or system failure. The permittee is required to maintain Class I Reliability for the sewage treatment facility on-site.

8. Permit Characterization:

( ) Issuance	(X) Existing Discharge
(X) Reissuance	( ) Proposed Discharge
( ) Revoke & Reissue	(X) Effluent Limited
( ) Owner Modification	(X) Water Quality Limited
( ) Board Modification	( ) WET Limit
( ) Change of Ownership/Name	(X) Interim Limits in Permit
Effective Date:	( ) Interim Limits in Other Document (attached)
( ) Municipal	(X) Compliance Schedule Required
SIC Code(s):	( ) Site Specific WQ Criteria
(X) Industrial	( ) Variance to WQ Standards
SIC Code(s):3081. 2821	( ) Water Effects Ratio
( ) POTW	(X) Discharge to 303(d) Listed Segment
( ) PVOTW	(X) Whole Effluent Toxicity Program Required
(X) Private	( ) Toxics Reduction Evaluation
( ) Federal	( ) Possible Interstate Effect
( ) State	(X) Storm Water Management Plan

9. Schematic of wastewater treatment system: See **Attachment B** for facility diagrams and a summary of operations at each outfall.

Table 1. Discharge Description

OUTFALL NUMBER	DISCHARGE SOURCE	TREATMENT UNITS	MAX 30-Day AVG FLOW (GPD)
001	Cooling Tower Blowdown, Steam Boiler Blowdown, Rainwater Runoff, Cooling Water (IWWTP), Miscellaneous Flows (including chilled water), and Outfalls 101 and 102	pH adjustment	189,100 (DMR Data)
901	Outfall 001 during wet weather events	None	275,000 (DMR data)
101	Internal Outfall- Industrial Wastewater Treatment Plant (IWWTP): process water and annual GW monitoring rinse and purge water.	Flow equalization, extended aeration activated sludge, sedimentation and multimedia filtration	36,000 design flow 33,300 (DMR Data)
102	Internal Outfall- Sanitary Wastewater Treatment Plant (SWWTP)	Screening, flow equalization, extended aeration activated sludge, sedimentation and chlorine disinfection.	9,000 design flow* 4,700 Max 30 day average (DMR Data)
002	Rainwater Runoff	NA (normally to 001)	10,000 (Form 2C)
003	Rainwater Runoff, Cooling Tower Blowdown, Steam Boiler Blowdown	NA (normally to 001)	56,700 (Form 2C)
004	Rainwater Runoff	Settling of storm water runoff in ponds before discharge.	1,470,000 (DMR Data)

* Prior to July 2003, the sewage treatment facility consisted of two plants in parallel; one 8750 gpd and one 9000 gpd for a total of 17,750 gpd. In July 2003, the 8700 gpd plant was taken off-line due to the low flows entering the plant; however, it is available if flows increase.

This facility uses ethylene glycol, terephthalic acid, and dimethyl terephthalate to produce a polyester resin. There are two processes used to produce the resin: a Dimethyl Terephthalate (DMT) based polymer process and a Terephthalic Acid (TA) based polymer process. Currently, the DMT-based polymer process represents the majority of resin production, whereas the TA-based polymer process makes up only a small percentage of overall production. However, by the end of 2011, du Pont anticipates all polymer production will be converted to the TA-based process. The TA-based polymer process will NOT introduce new pollutants; however, it will add additional hydraulic load to the IWWTP and change the character of the influent wastewater. Because characterization of the wastewater is not available at this time, a special condition requiring monitoring at Outfall 001 for all parameters in the VA WQS is included in the permit. The permit requires that the monitoring be performed and results reported within 180 days of the completion of conversion to a TA-based polymer process. In a separate process, the resin is extruded into a sheet (film) which is then cut to customer specifications, packaged, and shipped. Wastewater from this process is treated at an onsite process wastewater treatment plant. Sanitary wastewater generated at the facility is treated at an onsite sanitary wastewater treatment plant.

10. Sludge Use or Disposal: Process wastewater sludge is dewatered by centrifuge and hauled to the Shoosmith landfill in Chesterfield for disposal. Land application of the process sludge at the facility has been discontinued. Sanitary wastewater sludge is aerobically digested on site. The liquid sludge is then hauled to the City of Hopewell Primary Treatment Plant where it is mixed with the City's domestic wastewater and disinfected using sodium hypochlorite. This disinfected wastewater is then piped from the Primary Plant to the Hopewell Regional Wastewater Treatment Facility (VA0066630) for further treatment and dewatering of the sludge by centrifuge followed by incineration. Ash from incineration is transported to Waste Management Landfill in Charles City County for disposal. The sludge is transported in a truck mounted watertight tank approximately 5 miles along the following route: Discovery Drive → Left on Bermuda Hundred Road → Right on Allied Road → Left on State Route 10 → Left on Hummel Ross Road.

11. Discharge(s) Location Description: Hopewell Topographic Map, #99D. See **Attachment C** for location map.

12. Material Storage: In Form 2F the facility stated that no significant materials are currently stored in a manner that allows exposure to storm water. Annual application of pesticide and fertilizer is performed during dry weather and in accordance with product instructions. Herbicides are applied once a year or as needed during dry weather conditions and in accordance with label instructions.

13. Ambient Water Quality Information: The ambient water quality information for the James River was obtained from monitoring station 2-JMS087.01 located less than 1 mile upstream of the outfalls at Buoy 137 on the James River. During the 2010 305(b)/303(d) Water Quality Assessment, the segment was assessed as a Category 5A water ("A Water Quality Standard is not attained. The water is impaired or threatened for one or more designated uses by a pollutant(s) and requires a TMDL (303d list)."). See Item 24 for further impairment information. See **Attachment A** for ambient stream data.

14. Antidegradation Review & Comments:

    The State Water Control Board's Water Quality Standards includes an antidegradation policy (9 VAC 25-260-30). All state surface waters are provided one of three levels of antidegradation protection. For Tier 1 or existing use protection, existing uses of the water body and the water quality to protect these uses must be maintained. Tier 2 water bodies have water quality that is better than the water quality standards. Significant lowering of the water quality of Tier 2 waters is not allowed without an evaluation of the economic and social impacts. Tier 3 water bodies are exceptional waters and are so designated by regulatory amendment. The antidegradation policy prohibits new or expanded discharges into exceptional waters. The limitations in this permit were developed in accordance with § 303(d)(4) of the Clean Water Act. Therefore, antidegradation restrictions do not apply.

    The antidegradation review begins with a Tier determination. The river is considered a Tier 1 water. This determination is based on the Richmond-Crater Water Quality Management Plan, 9VAC25-720-60 which allocates BOD and ammonia in order to maintain a minimum dissolved oxygen of 5.0 mg/L in the river. The permit reissuance addresses an existing discharge. The waterbody is therefore, classified as Tier 1.

15. Site Visit: Date: 5/2/11 Performed by: Emilee Carpenter and Ray Jenkins
    See **Attachment D** for Site Inspection

16. Effluent Screening & Limitation Development:

    Outfall 001
    Effluent limitations for parameters submitted with the application were evaluated in accordance with the guidance memo 00-2011 and its amendments. Reasonable potential analyses were performed using MSTRANTI (version 2a) and STATS.EXE (version 2.0.4). Dilution ratios of 83.33:1 acute and 625:1 chronic were used in MSTRANTI as follows:

    83.33: 1 acute → A design flow of 1 MGD and 1Q10 flow of 82.33
    625:1 chronic → A design flow of 1 MGD and 7Q10 flow of 624

    These dilution ratios were obtained from the mixing zone analysis performed by We-Seng Lung, PhD, PE, in December 1998 for the facility. See **Attachment F** for the Lung Model. Any parameter that was reported as less than an acceptable quantification limit was not analyzed. Only those parameters that produced a result above the

associated Quantification Limit (QL) were evaluated; these parameters are listed in the Table below. Reasonable potential analyses for the parameters with aquatic standards were performed using STATS.EXE (version 2.0.4) to evaluate the need for a limitation to protect against aquatic toxicity. For parameters with standards based on Human Health (HH), the maximum observed values were compared to the HH WLAs calculated in MSTRANTI. All of the observed values were several orders of magnitude less than the WLAs; therefore, no limitations are needed for these parameters. Pollutants without an applicable standard cannot be evaluated at this time.

Radionuclides:
In the application, the values reported for Beta Particle and Photon Activity are in units of concentration (pCi/L) whereas the applicable water quality standard is an exposure expressed as mrem/yr. The EPA has established this same standard for community potable water systems (4 mrem/yr). Federal Regulation (40 CFR Part 141) states that compliance with the potable water standard may be assumed if the average annual concentration of Beta Particle and Photon Activity is less than 50 pCi/L. As indicated in Table 2 below, compliance with this standard is achieved.

Table 2. Outfall 001 Reasonable Potential Summary

Observed Pollutant	Max Observed Concentration	Aquatic WLA		Human Health WLA		Reasonable Potential
		Acute	Chronic	PWS	All Others	
cBOD5 (mg/L)	80					N/A
COD (mg/L)	756					N/A
TOC (mg/L)	31.5					N/A
TSS (mg/L)	95					N/A
Ammonia (mg/L)	1	694	539			NO
Bromide (mg/L)	0.7					N/A
TRC (mg/L)	0.3	1.6	6.9			YES
Color (pcu)	30					N/A
Fecal coliform (MPN/100mL)	>1600					N/A
Fluoride (mg/L)	0.54					N/A
Nitrate + Nitrite (mg/L)	8.9					N/A
Nitrogen, Total Organic (mg/L)	44.6					N/A
Phosphorus, Total (mg/L)	2.6					N/A
Alpha, Total (pCi/L)	1.9			9400		NO
Beta, Total (pCi/L)	5.6			2500 mrem/yr *[50 pCi/L]*		NO
Radium, Total (pCi/L)	1					N/A
Radium226, Total (pCi/L)	0.7			3100		NO
Sulfate (mg/L)	26			160,000		NO
Sulfide (mg/L)	0.4					N/A
Aluminum, Total (mg/L)	0.124					N/A
Boron, Total (mg/L)	0.03					N/A
Cobalt, Total (mg/L)	0.019					N/A
Iron, Total (mg/L)	1.18			190		NO
Magnesium, Total (mg/L)	5.08					N/A
Molybdenum, Total (mg/L)	0.845					N/A
Manganese, Total (mg/L)	0.131			*	*	N/A
Antimony, Total (mg/L)	0.102			*	*	N/A
Arsenic, Total (mg/L)	0.006	*	*	*	*	N/A
Chromium, Total (mg/L)	0.002			63		NO
Copper, Total (mg/L)	0.98	*	*	*	*	N/A
Nickel, Total (mg/L)	0.006	*	*	*	*	N/A
Zinc, Total (mg/L)	0.251	*	*	*	*	N/A
Chloride (mg/L)	153	72,000	140,000	160,000		NO
Hardness (mg/L)	85					N/A
Nitrate (mg/L)	8.6			6300		NO
TDS (mg/L)	394					N/A
Tributyltin (ug/L)	0.3	38	45			NO

Observed Pollutant	Max Observed Concentration	Aquatic WLA		Human Health WLA		Reasonable Potential
		Acute	Chronic	PWS	All Others	
Antimony, dissolved (ug/L)	164			3500	400,000	NO
Arsenic, dissolved (ug/L)	5.3	28,000	94,000	6300		NO
Barium, dissolved (ug/L)	62			1,300,000		NO
Cadmium, dissolved (ug/L)	1	210	520	3100		NO
Chromium VI, dissolved (ug/L)	< 3	1300	6900			NO
Copper, dissolved (ug/L)	68.4	770	4000	810,000		NO
Iron, dissolved (ug/L)	1,040			190,000		NO
Lead, dissolved (ug/L)	1.2	5900	5000	9400		NO
Manganese, dissolved (ug/L)	154			31,000		NO
Nickel, dissolved (ug/L)	8	11,000	9000	380,000	2,900,000	NO
Selenium, Total Recoverable (ug/L)	1.6 (dissolved)	1700	3100	110,000	2,600,000	NO
Zinc, dissolved (ug/L)	1960	6900	52,000	4,600,000	16,000,000	NO
E. coli (MPN/100mL)	1046				126 N/100mL	YES
Hydrogen Sulfide (ug/L)	12		1300			NO

* The standard for these metals is expressed in the dissolved form. Because dissolved data is available, the total recoverable data is not compared to the standard.

CBOD$_5$, TSS, Ammonia and TRC: The cBOD$_5$ average limitation is a performance based limitation that was included in the permit prior to the establishment of the Richmond-Crater 208 Plan. The 69 kg/d limit has therefore been maintained to avoid backsliding. In accordance with industrial permit writing convention, the maximum cBOD$_5$ limitation (152 kg/d) is twice the average loading assigned in the Richmond-Crater 208 Plan (ICI Americas, Inc.*). The maximum cBOD$_5$ loading is expressed in three significant figures in accordance with the RCWQMP average loading upon which it is based. The TSS limitations are also performance-based limitations. The calculations that established these limitations are based on 1985 data and are included in **Attachment F**. The TSS limits proposed in this reissuance are expressed in two significant figures as opposed to the three provided in the calculations in **Attachment F**. The change is in accordance with significant figures guidance, GM06-2016. The ammonia loading limitations are based on the Richmond-Crater 208 Plan (ICI Americas, Inc.*). Ammonia concentrations submitted with the application and concentrations based on the load allocation were compared to the Water Quality Standards; both indicated no change in the loading allocation were required. A limitation of 1.6 mg/l was calculated for TRC; however, the existing limitation of 0.50 mg/l was retained to avoid backsliding. The 0.50 mg/L limitation was a performance-based limitation, negotiated in a previous permit issuance. The origin of this limitation is memorialized in the attached "Chlorine Calculations." **See Attachment F for further information concerning the development of these limitations.**

* ICI Americas, Inc. is the entity assigned WLAs in the Richmond Crater WQMP. In 1997, DuPont bought ICI's polyester films, resins, and intermediates businesses. In 1999, E.I. DuPont de Nemours and Teijin Limited merged in the joint venture of DuPont-Teijin. Because the facility has remained in operation, the WLAs assigned in the RCWQMP are applied to the new owners.

Nutrients:
Although the facility is a source of nutrients, it is not considered a significant discharger. Downstream of the fall line in the Chesapeake Bay watershed, a "significant discharger" is defined as "a sewage treatment works discharging…with a design capacity of 0.1 million gallons per day or greater or an equivalent load discharged from industrial facilities" (9VAC25-820-10). "Equivalent Load" is defined in the same regulation as 5700 lbs/year of total nitrogen or 760 lbs per year of total phosphorus discharged by an industrial facility. Per 9VAC25-40-25, "point source dischargers" do not include storm water or non-contact cooling water. Consequently, only Outfall 001 is subject to the nutrient regulations. Although Outfall 001 includes approximately 41,000 gpd of storm water and cooling water, the entire flow at Outfall 001 was evaluated in order to be conservative. Annual loadings can be estimated based on average flows and concentrations, in this case pulled from the previous 3 years of DMR data. Per the table below, DuPont Teijin is not considered a significant discharger under the aforementioned regulations:

Pollutant	Average Concentration (mg/L)	Average Flow (GPD)	Annual Loading (lbs/year)		Equivalent Load (lbs/year)
Total Nitrogen	12.2 mg/L	0.1393	3750	<	5700
Total Phosphorus	1.08 mg/L	0.1393	332	<	760

Non-significant discharges that are not expanding are not subject to the Nutrient Trading General Permit (9VAC25-820). Because the discharge of nutrients is not addressed by the GP, it is appropriate to maintain the existing TP concentration limitation in the individual permit to avoid backsliding and TN monitoring based on Best Engineering Judgment. Since the maximum 30-day average flow of the facility has increased to 0.189 MGD, the Total Phosphorus loading limitation has increased accordingly. In accordance with GM07-2008 Amendment 2, physical or operational changes at industrial facilities would not be defined as upgrades if directed toward the quantity or quality of the materials produced or service rendered. Therefore, the increase in the max 30-day average flow at this facility and the conversion to TA-based polymer production do not constitute "expansion," and this increase in the total phosphorus loading limitation is consistent with the nutrient regulations.

pH:
Special Condition C.16 in the permit establishes time periods that the pH can be outside the 6.0 to 9.0 range. This condition implements EPA guidance (40 CFR Part 401) for point sources that continuously monitor pH. **See Attachment F for 40 CFR Part 401.**

E. coli:
The bacterial TMDL for the lower James River was approved 11/04/2010. The Report assigns DuPont Teijin an *E. coli* wasteload allocation of 1.74E+12 cfu/year. A limitation is assigned at Outfall 102 for 126 N/100mL to assure compliance with the TMDL. In addition, monitoring at Outfall 001 will be performed annually.

D.O.:
9VAC25-260-185.A establishes dissolved oxygen criteria applicable in the Chesapeake Bay and its tidal tributaries. As the lower James River is a tidal tributary of the Chesapeake Bay, these standards apply at the point of discharge. Different DO criteria apply for different designated uses and receiving stream salinities. At the point of discharge, the Open Water and Migratory fish spawning and nursery uses apply and the salinity is less than 0.5 ppt. Consequently, the following instream standards apply:

Table 3. Applicable Dissolved Oxygen Criteria.

Designated Use	Criteria Concentration/Duration	Temporal Application
Migratory fish spawning and nursery	7-day mean = 6 mg/L (tidal habitats with 0-0.5 ppt salinity)	February 1- May 31
	Instantaneous Minimum = 5 mg/L	
Open water	30-day mean = 5.5 mg/L (tidal habitats with 0-0.5 ppt salinity)	Year round
	7-day mean = 4 mg/L	
	Instantaneous minimum = 3.2 mg/L at temperatures <29 degrees C Instantaneous minimum = 4.3 mg/L at temperatures = 29 degrees C.	

To minimize the complexity of compliance reporting, DuPont has chosen to accept the most stringent of the criteria and RCWQMP allocations. The more stringent of the two year-round instantaneous minimum criteria is applied because ambient temperatures are recorded in the James River above 29 degrees C (see **Attachment A**). The limitations applied are protective of the WQS noted above and the loadings assigned in the Richmond Crater WQMP.

GW Evaluation:
As part of the application, DuPont Teijin requested permission to treat rinse and purge water from their annual groundwater sampling activities (performed under RCRA Corrective Actions) at the onsite industrial wastewater treatment plant. Approximately 3000 gallons of rinse and purge water is expected to be discharged to the facility once a year. The total volume is expected to be discharged to the plant in a single day, so the 3000 gallons is treated as a per day discharge. Results from ground water sampling activities were submitted for review. All observed concentrations were evaluated for reasonable potential assuming no treatment is achieved. A mass balance approach was not necessary in this case because the GW pollutant concentrations do not trigger limitations on their own. If a mass balance equation were performed to determine the mix concentration of the effluent plus the GW, the concentration could not be greater than the greater of the two input concentrations. Consequently, by evaluating the streams separately a more conservative analysis was performed. None of the pollutants showed reasonable potential to violate in stream WQS. Consequently, permission to treat the rinse and purge water is granted, effective the date that this permit is reissued. An upcoming "Final Remedy" under the RCRA Corrective Action is anticipated during the VPDES permit cycle. A reopener clause has been added to the permit in the event the Final Remedy is not consistent with authorization of the purge water discharge through the VPDES permit. See **Attachments F** for additional information.

Table 4. Outfall 001: Basis for Limits.

PARAMETER	BASIS FOR LIMIT	DISCHARGE LIMITS			MONITORING REQUIREMENTS	
		AVG	MIN	MAX	SAMPLING FREQUENCY	SAMPLE TYPE
001 Flow	NA	NL	NA	NL	Continuous	Recorded
002 pH	1	NA	6.0 s.u.	9.0 s.u.	Continuous	Recorded
004 TSS	2	100 kg/d	NA	170 kg/d	1/Week	24 HC
005 TRC	2	NA	NA	0.50 mg/l	1/Week	Grab
012 Total Phosphorus	2	2.0 mg/l 1400 g/d	NA	NL	1/Week	24 HC
013 Total Nitrogen	2	NL	NA	NL	1/Week	24 HC
038 *Interim* DO (Nov – May)	3	Monthly Average Minimum of 3.1 mg/l			1/Day	Grab
317 *Interim* DO (June – Oct)	3	Monthly Average Minimum of 5.8 mg/l			1/Day	Grab
038 *Final* DO (Nov – May)	1	6.0 mg/L	5.0 mg/L	NA	1/Day	Grab
317 *Final* DO (June – Oct)	1,3	5.8 mg/L	4.3 mg/L	NA	1/Day	Grab
039 Ammonia-N	3	3600 g/d	NA	7300 g/d	1/Week	24 HC
120 *E. coli*	5	NL	NA	NA	1/Year	Grab
159 $CBOD_5$	3	69 kg/d	NA	152 kg/d	1/Week	24 HC
225 pH, Total Excursion Time	4	446 Minutes				
226 pH, Individual Excursion Time	4	60 Minutes				

1. Water Quality Standards
2. Best Engineering Judgment
3. Richmond Crater 208 Plan
4. 40 CFR Part 401
5. Lower James River Bacteria TMDL

Outfall 101
OCPSF Guidelines Part 414: Subpart D and Subpart I; SIC CODES 3081 and 2821

The BOD_5 and TSS limitations are based on Subpart D -- Thermoplastic Resins -- of the Organic Chemicals and Plastics and Synthetic Fibers (OCPSF) Federal effluent guidelines (See **Attachment J**). The limitations for the organic chemicals are from Subpart I -- Direct Discharge Point Sources That Use End-of-Pipe Biological Treatment -- of the OCPSF guidelines. There are no metal bearing waste streams. The organic chemical limitations were

calculated by multiplying the average 30-day maximum flow for this outfall by multipliers provided by the OCPSF Guidelines for each parameter. The average 30-day maximum flow for Outfall 101 as shown in Attachment E is 0.0357 MGD. The 2006 permit was calculated with loadings based on a flow of 0.048 MGD; consequently, the limitations proposed for this reissuance are more stringent. The limitations are expressed in the same number of significant figures as the multipliers, in accordance with the scientific rules of significant figures. While GM06-2016 recommends loading limitations be expressed in whole numbers, it is the permit writer's best professional judgment that expression in whole numbers is not advantageous in this case. This judgment is based on the following:

1) Loadings would need to be expressed in ug/d. The unit does not currently exist in the CEDS database.
2) All limitations would need to be individually footnoted to express the number of significant figures.
3) Expression of the loadings as a non-whole number allows clear expression of the number of significant figures and will minimize potential reporting errors.
4) The current expression in kg/d is consistent with the units used in the previous permit cycles and will provide for unit consistency in the DEQ database.

Table 5. Outfall 101: Basis for Limits.

PARAMETER	BASIS				PERMIT LIMIT		MONITORING REQUIREMENTS	
	EFFLUENT GUIDELINES							
	BPT Multiplier (µg/L)		BAT Multiplier (µg/L)					
	Monthly Average	Daily Maximum	Monthly Average	Daily Maximum	Monthly Average (kg/d)	Daily Maximum (kg/d)	FREQUENCY	SAMPLE TYPE
Flow (MGD)	0.0357	0.0357	0.0357	0.0357	NL	NL	1/Week	Estimate
BOD_5 (mg/L)	24	64			3.2	8.6	1/Week	24 HC
TSS (mg/L)	40	130			5.4	18	1/Week	24 HC
Acenaphthene			22	59	0.0030	0.0080	1/Year	Grab
Acrylonitrile			96	242	0.013	0.0327	1/Year	Grab
Benzene			37	136	0.0050	0.0184	1/Year	Grab
Carbon Tetrachloride			18	38	0.0024	0.0051	1/Year	Grab
Chlorobenzene			15	28	0.0020	0.0038	1/Year	Grab
1,2,4-Trichlorobenzene			68	140	0.0092	0.019	1/Year	Grab
Hexachlorobenzene			15	28	0.0020	0.0038	1/Year	Grab
1,2-Dichloroethane			68	211	0.0092	0.0285	1/Year	Grab
1,1,1-Trichloroethane			21	54	0.0028	0.0073	1/Year	Grab
Hexachloroethane			21	54	0.0028	0.0073	1/Year	Grab
1,1-Dichloroethane			22	59	0.0030	0.0080	1/Year	Grab
1,1,2-Trichloroethane			21	54	0.0028	0.0073	1/Year	Grab
Chloroethane			104	268	0.0140	0.0362	1/Year	Grab
Chloroform			21	46	0.0028	0.0062	1/Year	Grab
2-Chlorophenol			31	98	0.0042	0.013	1/Year	Grab
1,2-Dichlorobenzene			77	163	0.010	0.0220	1/Year	Grab
1,3-Dichlorobenzene			31	44	0.0042	0.0059	1/Year	Grab
1,4-Dichlorobenzene			15	28	0.0020	0.0038	1/Year	Grab
1,1-Dichloroethylene			16	25	0.0022	0.0034	1/Year	Grab
1,2-trans-Dichloroethylene			21	54	0.0028	0.0073	1/Year	Grab
2,4-Dichlorophenol			39	112	0.0053	0.0151	1/Year	Grab
1,2-Dichloropropane			153	230	0.0207	0.0311	1/Year	Grab
1,3-Dichloropropylene			29	44	0.0039	0.0059	1/Year	Grab

PARAMETER	BASIS				PERMIT LIMIT		MONITORING REQUIREMENTS	
	EFFLUENT GUIDELINES							
	BPT Multiplier (µg/L)		BAT Multiplier (µg/L)					
	Monthly Average	Daily Maximum	Monthly Average	Daily Maximum	Monthly Average (kg/d)	Daily Maximum (kg/d)	FREQUENCY	SAMPLE TYPE
2,4-Dimethyphenol			18	36	0.0024	0.0049	1/Year	Grab
2,4-Dinitrotoluene			113	285	0.0153	0.0385	1/Year	Grab
2,6-Dinitrotoluene			255	641	0.0345	0.0866	1/Year	Grab
Ethylbenzene			32	108	0.0043	0.0146	1/Year	Grab
Fluoranthene			25	68	0.0034	0.0092	1/Year	Grab
Methylene Chloride			40	89	0.0054	0.012	1/Year	Grab
Methyl Chloride			86	190	0.012	0.026	1/Year	Grab
Hexachlorobutadiene			20	49	0.0027	0.0066	1/Year	Grab
Napthalene			22	59	0.0030	0.0080	1/Year	Grab
Nitrobenzene			27	68	0.0036	0.0092	1/Year	Grab
2-Nitrophenol			41	69	0.0055	0.093	1/Year	Grab
4-Nitrophenol			72	124	0.0097	0.0168	1/Year	Grab
2,4-Dinitrophenol			71	123	0.0096	0.0166	1/Year	Grab
4,6-Dinitro-o-cresol			78	277	0.010	0.0374	1/Year	Grab
Phenol			15	26	0.0020	0.0035	1/Year	Grab
Bis(2-ethylhexyl)phthalate			103	279	0.0139	0.0377	1/Year	Grab
Di-n-butyl phthalate			27	57	0.0036	0.0077	1/Year	Grab
Diethyl phthalate			81	203	0.011	0.0274	1/Year	Grab
Dimethyl phthalate			19	47	0.0026	0.0064	1/Year	Grab
Benzo(a)anthracene			22	59	0.0030	0.0080	1/Year	Grab
Benzo(a)pyrene			23	61	0.0031	0.0082	1/Year	Grab
3,4-Benzofluoranthene			23	61	0.0031	0.0082	1/Year	Grab
Benzo(k)fluoranthene			22	59	0.0030	0.0080	1/Year	Grab
Chrysene			22	59	0.0030	0.0080	1/Year	Grab
Acenaphthylene			22	59	0.0030	0.0080	1/Year	Grab
Anthracene			22	59	0.0030	0.0080	1/Year	Grab
Fluorene			22	59	0.0030	0.0080	1/Year	Grab
Phenanthrene			22	59	0.0030	0.0080	1/Year	Grab
Pyrene			25	67	0.0034	0.0090	1/Year	Grab
Tetrachloroethylene			22	56	0.0030	0.0076	1/Year	Grab
Toluene			26	80	0.0035	0.011	1/Year	Grab
Trichloroethylene			21	54	0.0028	0.0073	1/Year	Grab
Vinyl Chloride			104	268	0.0140	0.0362	1/Year	Grab

Outfall 102

Table 6. Outfall 102: Basis for Limits

PARAMETER	BASIS FOR LIMIT	DISCHARGE LIMITS			MONITORING REQUIREMENTS	
		MONTHLY AVG	MIN	MAX	SAMPLING FREQUENCY	SAMPLE TYPE
001 Flow	NA	NL	NL	NA	Continuous	TIRE
003 BOD_5	1	30 mg/l	NA	45 mg/l	1/Month	Grab
004 TSS	1	30 mg/l	NA	45 mg/l	1/Month	Grab
120 E. coli	3	126 N/100 mL	NA	NA	4/Month	Grab
157 TRC* contact	2	NA	NA	1.5 mg/l	1/Day	Grab
213 TRC* contact	2	NA	NA	0.60 mg/l	1/Day	Grab

1. Federal Effluent Guidelines
2. Best Engineering Judgment
3. Water-Quality Based/TMDL

* 157 and 213 TRC samples are taken prior to dechlorination

Outfalls 901, 002, 003, & 004

Storm water flows from the ditches at outfalls 002 and 003 are conveyed by drop inlet and pipe to Outfall 901 (Outfall 001 including storm water), and the outlets of those ditches to the river are barricaded. DuPont has estimated that it would require more than 3 inches of rain per hour to overflow the barricade on 002, and 2.75 to 3 inches of rain per hour to overflow the barricade on 003. Note that the samples collected for the purpose of completing Form 2F were collected from the ditches during storm events just prior to the flow entering the drop inlets. Outfall 004 discharges directly to the James River. **See Attachment E for storm water monitoring data.**

Form 2F sampling data for these outfalls were evaluated according to current agency guidance. All quantification limits were acceptable.

Guidance Memo 96-001 recommends that chemical-specific water quality-based limits not be placed on storm water outfalls at this time because the methodology for developing limits and the proper method of sampling is still a concern and under review/reevaluation by EPA. Exceptions would be where a VPDES permit for a storm water discharge has been issued that includes effluent limitations (backsliding must be considered before these limitations can be modified) and where there are reliable data, obtained using sound, scientifically defensible procedures, which provide the justification and defense for an effluent limitation. Therefore, in lieu of limitations, pollutants are assessed against screening criteria developed solely to identify those pollutants that should be given special emphasis during development and assessment of the Storm Water Pollution Prevention Plan (SWPPP).

Each screening criterion is established as the most stringent of either (1) two times the applicable pollutant's acute criterion, or where applicable, (2) the pollutant's benchmark monitoring concentration as contained in DEQ's VPDES general permit for storm water associated with industrial activity. Any storm water outfall effluent data submitted by the permittee that contained pollutants above the established screening criteria triggered the need for monitoring of that specific pollutant in Part I A of the permit for that outfall. The screening criteria are then utilized in the permit as a comparative value. Based on the above, monitoring was established for the pollutants noted in the table below. In addition, annual toxicity screening was required for these same outfalls.

The SWPPP required by Part I.E.3 of the permit is designed to reduce pollutants in storm water runoff. Quarterly monitoring for the pollutants noted in the table below and annual whole effluent toxicity testing is recommended. Pollutant specific monitoring results above the established comparative value or whole effluent toxicity testing which results in an LC_{50} of less than 100% effluent will justify the need to reexamine the effectiveness of the SWPPP and any best management practices (BMPs) being utilized. The goal of the SWPPP is to reduce pollutants to the maximum extent practicable. An annual report is to be submitted to the Regional office and shall

include the data collected the previous year with an indication if the SWPPP or any BMPs were modified based on the monitoring results.

In addition to comparing the observed value with applicable sector specific benchmarks, the Piedmont Regional Office compares all observed pollutant concentrations with the benchmarks established for all industrial sectors. This comparison is designed to evaluate the effectiveness of a facility's BMPs. There are several parameters at each outfall that exceed the general benchmark concentration and trigger a BMP evaluation. Consequently, the exceeded benchmark parameters are included in Part I.E.4.c of the permit, which requires monitoring and reporting for the pollutants and corrective actions under Part I.E.2.i. if the benchmarks are exceeded. Corrective action includes revision of the SWPPP and/or modification or addition of BMPs.

Table 7. Storm Water Management Evaluation Screening

Parameter	2x Acute Standard (mg/l)	DEQ Benchmarks	Outfall	Maximum Concentration Reported
BOD_5	N/A	30 mg/L	901	**31 mg/L**
			002	8 mg/L
			003	**90 mg/L**
			004	24 mg/L
COD	NA	110 mg/L	901	**178 mg/L**
			002	61 mg/L
			003	**194 mg/L**
			004	97 mg/L
TSS	N/A	100 mg/L	901	23 mg/L
			002	13 mg/L
			003	33 mg/L
			004	29 mg/L
Total Phosphorus	N/A	2 mg/L	901	0.5 mg/L
			002	0.15 mg/L
			003	0.68 mg/L
			004	0.27 mg/L
Aluminum, Total	N/A	750 mg/L	901	0.484 mg/L
			002	1.42 mg/L
			003	0.527 mg/L
			004	1.45 mg/L
Total Nitrogen	N/A	2.2 mg/L	901	**5.8 mg/L**
			002	**3.6 mg/L**
			003	**3.5 mg/L**
			004	**3.8 mg/L**
Total Kjeldahl Nitrogen	N/A	1.5 mg/L	901	**3.61 mg/L**
			002	**2.99 mg/L**
			003	**1.88 mg/L**
			004	**2.56 mg/L**
Iron	N/A	1.0 mg/L	901	0.923 mg/L
			002	**1.93 mg/L**

Parameter	2x Acute Standard (µg/l)	DEQ Benchmarks	Outfall	Maximum Concentration Reported
			003	0.64 mg/L
			004	**1.6 mg/L**
Cadmium*	5.0	2.1 ug/L	901	0.7 ug/L
			002	1.2 ug/L
			003	0.6 ug/L
			004	**6 ug/L**
Chromium*	820	16 ug/L	901	2 ug/L
			002	4 ug/L
			003	4 ug/L
			004	2 ug/L
Copper*	18	18 ug/L	901	**170 ug/L**
			002	**21 ug/L**
			003	**28 ug/L**
			004	**60 ug/L**
Lead*	140	120 ug/L	901	6 ug/L
			002	13 ug/L
			003	<5 ug/L
			004	15 ug/L
Zinc*	170	***120 ug/L***	901	**699** ug/L
			002	**1490** ug/L
			003	**432** ug/L
			004	**1900** ug/L

*A stream hardness of 66.7 mg/l $CaCO_3$ was used to calculate standards. All other data input in MSTRANTI is representative of the stream; however, hardness is the only variable that affects the calculation of metals standards.

*The Zinc benchmark value is in **Bolded Italics** because it is the single applicable benchmark value to the industrial activity that occurs on the Dupont Teijin site.*

The highlighted cells in the table represent the parameters and outfalls for which the observed values exceeded either the screening criteria or the benchmarks. The screening criteria and benchmarks are highlighted if they were exceeded.

A Storm Water Management Evaluation will be required for the following parameters due to storm water data exceeding two times the acute water quality standard:

Outfall 901: Zinc and Copper
Outfall 004: Zinc, Copper, and Cadmium

Benchmark Monitoring and a BMP evaluation will be required for the following parameters due to storm water data exceeding DEQ benchmark values:

Outfall 901: BOD_5, COD, TN, TKN, Zinc, Copper
Outfall 002: TN, TKN, Iron, Zinc, Copper
Outfall 003: BOD_5, COD, TN, TKN, Copper, Zinc
Outfall 004: TN, TKN, Iron, Cadmium, Copper, Zinc

Part I.A. Monitoring:
Outfalls 901 and 004 will be monitored quarterly for the pollutants that exceeded two times the acute water quality standard as shown below. Outfalls 901, 002, 003 and 004 are monitored annually for the parameters that exceeded DEQ benchmarks at the respective outfalls.

Table 8: Outfall 901 Monitoring

PARAMETER	DISCHARGE LIMITS			MONITORING REQUIREMENTS	
	AVG	MIN	MAX	SAMPLING FREQUENCY	SAMPLE TYPE
001 Flow	NL	NA	NL	1/3 Months	Estimate
003 BOD_5	NL	NA	NL	1/Year	Grab
008 COD	NL	NA	NL	1/Year	Grab
013 Total Nitrogen	NL	NA	NL	1/Year	Grab
068 Total Kjeldahl Nitrogen (TKN)	NL	NA	NL	1/Year	Grab
361 Iron, Total Recoverable	NL	NA	NL	1/Year	Grab
442 Copper, Total Recoverable	NL	NA	NL	1/3 Months	Grab
448 Zinc, Total Recoverable	NL	NA	NL	1/3 Months	Grab

Table 9: Outfall 002 Monitoring

PARAMETER	DISCHARGE LIMITS			MONITORING REQUIREMENTS	
	AVG	MIN	MAX	SAMPLING FREQUENCY	SAMPLE TYPE
001 Flow	NL	NA	NL	1/Year	Estimate
013 Total Nitrogen	NL	NA	NL	1/Year	Grab
068 Total Kjeldahl Nitrogen (TKN)	NL	NA	NL	1/Year	Grab
361 Iron, Total Recoverable	NL	NA	NL	1/Year	Grab
442 Copper, Total Recoverable	NL	NA	NL	1/Year	Grab
448 Zinc, Total Recoverable	NL	NA	NL	1/Year	Grab

Table 10: Outfall 003 Monitoring

PARAMETER	DISCHARGE LIMITS			MONITORING REQUIREMENTS	
	AVG	MIN	MAX	SAMPLING FREQUENCY	SAMPLE TYPE

Table 10: Outfall 003 Monitoring					
PARAMETER	DISCHARGE LIMITS			MONITORING REQUIREMENTS	
	AVG	MIN	MAX	SAMPLING FREQUENCY	SAMPLE TYPE
001 Flow	NL	NA	NL	1/Year	Estimate
003 BOD_5	NL	NA	NL	1/Year	Grab
008 COD	NL	NA	NL	1/Year	Grab
013 Total Nitrogen	NL	NA	NL	1/Year	Grab
068 Total Kjeldahl Nitrogen (TKN)	NL	NA	NL	1/Year	Grab
442 Copper, Total Recoverable	NL	NA	NL	1/Year	Grab
448 Zinc, Total Recoverable	NL	NA	NL	1/Year	Grab

Table 11: Outfall 004 Monitoring					
PARAMETER	DISCHARGE LIMITS			MONITORING REQUIREMENTS	
	AVG	MIN	MAX	SAMPLING FREQUENCY	SAMPLE TYPE
001 Flow	NL	NA	NL	1/3 Months	Estimate
013 Total Nitrogen	NL	NA	NL	1/Year	Grab
068 Total Kjeldahl Nitrogen (TKN)	NL	NA	NL	1/Year	Grab
361 Iron, Total Recoverable	NL	NA	NL	1/Year	Grab
440 Cadmium, Total Recoverable	NL	NA	NL	1/3 Months	Grab
442 Copper, Total Recoverable	NL	NA	NL	1/3 Months	Grab
448 Zinc, Total Recoverable	NL	NA	NL	1/3 Months	Grab

Part I.E. WET Monitoring:
Since outfalls 002 and 003 are only expected to discharge during extremely large rainfall events, the staff does not propose whole effluent toxicity testing at these outfalls. As noted above Outfalls 002 and 003 discharge via Outfall 901 during high flow conditions equivalent (excluding comingled blow-down process wastewater or other storm water contributing base flows) to a 2.5 inch, 1-hour rainfall with an annual return frequency of 10% (i.e. a 10-year, 1-hour storm event). Consequently, WET testing at outfalls 002 and 003 will not be required due to the diversion of the first flush runoff flows to Outfall 901 via the drop inlets, and ultimate significant dilution with James River flows. If subsequent reported data shows a potential need for that decision to be re-evaluated, DEQ may do so under the WQ Criteria Reopener special condition (Part I.C.10).

17. Antibacksliding Statement: All limits are at least as stringent as in the previous permit. The Total Phosphorus loading limitation for Outfall 001 was adjusted to reflect the increase in the maximum 30-day average flow for the

facility. This loading is still consistent with the originally assigned concentration limitation. Because the loading limitation is based on the concentration, adjustment of the loading limitation in accordance with changes in flow does not constitute backsliding. The cBOD5 weekly average limitation at Outfall 001 and several limitations for Outfall 101 were revised to be expressed in 2 significant figures. This change in the expression of the limitation does not constitute backsliding.

18. Special Conditions:

B.1. **Additional Chlorine Limitations and Monitoring Requirements (Outfall 102)**
Rationale: Required by Sewerage Collection and Treatment Regulations 9 VAC 25-790 and Water Quality Standards 9 VAC 25-260-170, Bacteria; Other Recreational Waters. Also, 40 CFR 122.41(e) requires the permittee, at all times, to properly operate and maintain all facilities and systems of treatment in order to comply with the permit. This ensures proper operation of chlorination equipment to maintain adequate disinfection.

C.1. **Notification Levels**
Rationale: Required by VPDES Permit Regulation, 9 VAC 25-31-200 A for all manufacturing, commercial, mining, and silvicultural dischargers.

C.2. **O&M Manual Requirement**
Rationale: Required by Code of Virginia § 62.1-44.16; VPDES Permit Regulation, 9 VAC 25-31-190 E, and 40 CFR 122.41(e). These require proper operation and maintenance of the permitted facility. Compliance with an approved O&M manual ensures this.

C.3. **Licensed Operator Requirement**
Rationale: Required by VPDES Permit Regulation, 9 VAC 25-31-200 C and The Code of Virginia § 54.1-2300 et seq, Rules and Regulations for Waterworks and Wastewater Works Operators (18 VAC 160-20-10 et seq.), requires licensure of operators.

C.4. **95% Capacity Reopener (Outfall 102)**
Rationale: Required by VPDES Permit Regulation, 9 VAC 25-31-200 B 4 for all POTW and PVOTW permits.

C.5. **CTC & CTO Requirement (Outfall 102)**
Rationale: Required by Code of Virginia § 62.1-44.19; Sewage Collection and Treatment Regulation, 9 VAC 25-790.

C.6. **Reliability Class (Outfall 102)**
Rationale: Required by Sewage Collection and Treatment Regulations, 9 VAC 25-790-70 for all permits issued to treatment works treating domestic sewage.

C.7. **Materials Handling/Storage**
Rationale: 9 VAC 25-31-50 A prohibits the discharge of any wastes into State waters unless authorized by permit. Code of Virginia § 62.1-44.16 and 62.1-44.17 authorizes the Board to regulate the discharge of industrial waste or other waste.

C.8. **Nutrient Reopener**
Rationale: 9 VAC 25-40-70 A authorizes DEQ to include technology-based annual concentration limits in the permits of facilities that have installed nutrient control equipment, whether by new construction, expansion or upgrade. 9 VAC 25-31-390 A authorizes DEQ to modify VPDES permits to promulgate amended water quality standards.

C.9. **Water Quality Criteria Reopener**
Rationale: VPDES Permit Regulation, 9 VAC 25-31-220 D requires effluent limitations to be established which will contribute to the attainment or maintenance of the water quality standards.

C.10. **Compliance Reporting**
Rationale: Authorized by VPDES Permit Regulation, 9 VAC 25-31-190 J 4 and 220 I. This condition is necessary when pollutants are monitored by the permittee and a maximum level of quantification and/or a specific analytical method is required in order to assess compliance with a permit limit or to compare effluent quality with a numeric criterion. The condition also establishes protocols for calculation of reported values. Part d. was added in

accordance with staff decisions made 7/27/10. Part e. was added to address the interim dissolved oxygen limitations.

C.11. **Sludge Use and Disposal (102)**
Rationale: VPDES Permit Regulation, 9 VAC 25-31-100 P; 220 B 2; and 420 through 720, and 40 CFR Part 503 require all treatment works treating domestic sewage to submit information on their sludge use and disposal practices and to meet specified standards for sludge use and disposal.

C.12. **Sludge Reopener (102)**
Rationale: Required by VPDES Permit Regulation, 9 VAC 25-31-220 C 4 for all permits issued to treatment works treating domestic sewage.

C.13. **Total Maximum Daily Load (TMDL) Reopener**
Rationale: Section 303(d) of the Clean Water Act requires that TMDLs be developed for streams listed as impaired. This special condition is to allow the permit to be reopened if necessary to bring it into compliance with any applicable TMDL approved for the receiving stream. The re-opener recognizes that, according to Section 402(o)(1) of the Clean Water Act, limits and/or conditions may be either more or less stringent than those contained in this permit. Specifically, they can be relaxed it they are the result of a TMDL, basin plan, or other wasteload allocation prepared under section 303 of the Act.

C.14. **Closure Plan**
Rationale: Code of Virginia §§ 62.1-44.16 and 62.1-44.19 of the State Water Control law. This condition establishes the requirement to submit a closure plan for wastewater treatment facilities if a treatment facility is being replaced or is expected to close.

C.15. **pH Excursions**
Rationale: 40 CFR Part 401. This condition establishes time limits that pH values may be outside the range stated in Part I.A. of the permit. A total time limit for any calendar month and a time limit for an individual excursion are established. This special condition implements EPA guidance for point sources that continuously monitor pH.

C.16. **Chilled Water Discharge**
Rationale: This condition authorizes discharges less than or equal to 5000 gallons per day of chilled water at outfall 001. This condition was initially added to the permit several cycles ago to address unusual discharges of chilled water. The unusual discharges were presumably associated with HVAC units that dated back to the 70s. It established a 5000 gpd threshold to minimize reporting under Part II.H of the permit for situations that are not expected to have an adverse impact. Since the establishment of the permit condition, 7 of the 9 old units have been replaced and replacement of the last two is anticipated within the next year. Although the new units are less prone to leakage than old units, the potential for leaks from these systems still exists. Minor operational leaks occur on a regular basis and are accounted for in the application Form 2C. This condition establishes a volume that qualifies as unusual/extraordinary in order to avoid unnecessary reporting throughout the permit cycle. An accidental discharge is simply any discharge that is not purposeful (i.e. coil leaks versus maintenance draining).

C.17. **CER**
Rationale: §62.1-44.16 of the Code of Virginia requires industrial facilities to obtain DEQ approval for proposed discharges of industrial wastewater. A CER means a document setting forth preliminary concepts or basic information for the design of industrial wastewater treatment facilities and the supporting calculations for sizing the treatment operations.

C.18**. Water Quality Criteria Monitoring**
Rationale: State Water Control Law §62.1-44.21 authorizes the Board to request information needed to determine the discharge's impact on State waters. To ensure that water quality standards are maintained, the permittee is required to analyze the facility's effluent for the substances noted. This condition is prompted by the facility's intent to convert to a TA-based polymer process and the permit boilerplate language was customized to reflect this specific change in industrial process. QLs for the metals are assigned based on the higher of Agency established minimum QLs or the most conservative MSTRANTI target values. Site specific target values were not assessed, as the manufacturing changes may result in effluent hardness variation.

C.19. **Compliance Schedule**
Rationale: 9VAC25-31-250 allows for schedules of compliance, when appropriate, which will lead to compliance with the Clean Water Act, the State Water Control Law and regulations promulgated under them. A compliance schedule is granted in this permit for a new Dissolved Oxygen limitation at Outfall 001.

C.20. **Groundwater Sampling Purge**
Rationale: See Part 16 of the Fact Sheet for discussion of authorization of groundwater sampling purge water. A reopener clause is included to address any changes that may occur with the upcoming Final Remedy under RCRA Corrective Action.

D. **Whole Effluent Toxicity Testing**
Rationale: VPDES Permit Regulation, 9 VAC 25-31-210 and 220 I, requires monitoring in the permit to provide for and assure compliance with all applicable requirements of the State Water Control Law and the Clean Water Act. See **Attachment G**.

E. **Storm Water Management**
Rationale: VPDES Permit Regulation, 9 VAC 25-31-10 defines discharges of storm water from industrial activity. 9 VAC 25-31-120 requires a permit for these discharges. The Storm Water Pollution Prevention Plan requirements of the permit are derived from the VPDES general permit for discharges of storm water associated with industrial activity, 9 VAC 25-151-10 et seq. VPDES Permit Regulation, 9 VAC 25-31-220 K, requires use of best management practices where applicable to control or abate the discharge of pollutants when numeric effluent limits are infeasible or the practices are necessary to achieve effluent limit or to carry out the purpose and intent of the Clean Water Act and State Water Control Law. Based on the SIC codes, sector specific requirements from Sector C and Y apply to the storm water discharged from the site.

Part II, Conditions Applicable to All Permits
Rationale: VPDES Permit Regulation, 9 VAC 25-31-190 requires all VPDES permits to contain or specifically cite the conditions listed.

19. NPDES Permit Rating worksheet: Total Score: 103 See **Attachment H** for Work Sheet.

20. Changes to the permit:

Changes to Cover Page

Change	From	To	Rationale
Boilerplate Language & Formatting	Former boilerplate that doesn't incorporate the application by reference. Director Signatory.	Current boilerplate (consistent with GM10-2003). Deputy Director signatory.	Updated in accordance with GM10-2003 and current PRO policy.
Facility Name	DuPont Teijin Films- Hopewell Site	DuPont Teijin Films	In accordance with the permit application
Facility Location	111 Discovery Drive	3600 Discovery Drive	Revised in accordance with permit application. The change was verified with the facility contact.
Stream Section	1	1o	In accordance with WQS (2/6/11)

Effluent Monitoring Changes for Outfalls 001

Parameter	Limitations		Monitoring Requirements		Rationale
	From	To	From	To	
Final DO (Nov-May), Minimum	3.1 mg/L Monthly Average	6.0 mg/L Weekly Average; 5.0 mg/L Instantaneous	1/Day	1/Day	9VAC25-260-185.A.
Final DO (June-Oct	-	4.3 mg/L Instantaneous	-	1/Day	9VAC25-260-185.A and the RCWQMP allocations for 2010
TSS	101 kg/d 167 kg/d	100 kg/d 170 kg/d	1/Week	1/Week	In accordance with GM06-2016.
Ammonia	3.6 kg/d 7.3 kg/d	3600 g/d 7300 g/d	1/Week	1/Week	In accordance with GM06-2016.
TP Loading	1.25 kg/d	1400 g/d	1/Week	1/Week	In accordance with the increase in the maximum 30-day average flow. Reduced to 2 significant figures and adjusted to a whole number based on GM06-2016.
E. coli	-	NL	-	1/Year	Sampling added to confirm compliance with the approved TMDL.

Effluent Monitoring Changes for Outfall 101

Parameter	Limitations		Monitoring Requirements		Rationale
	From	To	From	To	
FEG limitations	Loading limitations based on 0.048 MGD	Loading limitations based on 0.0357 MGD	No Change		FEG loading limitations at Outfall 101 were updated to reflect current flows at the facility. Because the flow at Outfall 101 has decreased all of the loading limitations have decreased.

Effluent Monitoring Changes for Outfall 102

Parameter	Limitations		Monitoring Requirements		Rationale
	From	To	From	To	
TSS	30.0 mg/l Monthly Ave.	30 mg/l Monthly Ave	1/Week	1/Week	Guidance Memo 06-2016
TRC contact (Code 157)	1.50 mg/L	1.5 mg/L	1/Day	1/Day	Guidance Memo 06-2016

Parameter	Limitations		Monitoring Requirements		Rationale
E. coli	-	126 N/100mL	-	4/Month	Added in accordance with the approved TMDL.
BOD_5	45 mg/L Daily Max	45 mg/L Weekly Average	1/Month	1/Month	Revised to weekly average to be consistent with municipal permits
TSS	45.0 mg/L Daily Max	45 mg/L Weekly Average	1/Week	1/Week	Revised to weekly average to be consistent with municipal permits and revised significant figures in accordance with Guidance Memo 06-2016

Effluent Monitoring Changes for Outfalls 901

Parameter	Limitations		Monitoring Requirements		Rationale
	From	To	From	To	
BOD_5	-	NL	-	1/Year	Added in accordance with the DEQ SW Benchmark Evaluation.
COD	-	NL	-	1/Year	Added in accordance with the DEQ SW Benchmark Evaluation.
Total Nitrogen	-	NL	-	1/Year	Added in accordance with the DEQ SW Benchmark Evaluation.
Total Kjeldahl Nitrogen (TKN)	-	NL	-	1/Year	Added in accordance with the DEQ SW Benchmark Evaluation.
Total Recoverable Iron	-	NL	-	1/Year	Added in accordance with the DEQ SW Benchmark Evaluation.
Copper	Dissolved	Total Recoverable	1/3M	1/3M	Revised in accordance with current PRO policy.
Zinc	Dissolved	Total Recoverable	1/3M	1/3M	Revised in accordance with current PRO policy.

Effluent Monitoring Changes for Outfall 002

Parameter	Limitations		Monitoring Requirements		Rationale
	From	To	From	To	
Flow	-	NL	-	1/Year	Added in accordance with current SW guidance (GM01-2003).
Total Nitrogen	-	NL	-	1/Year	Added in accordance with the DEQ SW Benchmark Evaluation.
Total Kjeldahl Nitrogen (TKN)	-	NL	-	1/Year	Added in accordance with the DEQ SW Benchmark Evaluation.
Total Recoverable Iron	-	NL	-	1/Year	Added in accordance with the DEQ SW Benchmark Evaluation.
Total Recoverable Copper	-	NL	-	1/Year	Added in accordance with the DEQ policy for SW screening (2x acute)
Total Recoverable Zinc	-	NL	-	1/Year	Added in accordance with the DEQ policy for SW screening (2x acute)

Effluent Monitoring Changes for Outfall 003

Parameter	Limitations		Monitoring Requirements		Rationale
	From	To	From	To	
Flow	-	NL	-	1/Year	Added in accordance with current SW guidance (GM01-2003).
BOD5	-	NL	-	1/Year	Added in accordance with the DEQ SW Benchmark Evaluation.
COD	-	NL	-	1/Year	Added in accordance with the DEQ SW Benchmark Evaluation.
Total Nitrogen	-	NL	-	1/Year	Added in accordance with the DEQ SW Benchmark Evaluation.
Total Kjeldahl Nitrogen (TKN)	-	NL	-	1/Year	Added in accordance with the DEQ SW Benchmark Evaluation.
Total Recoverable Copper	-	NL	-	1/Year	Added in accordance with the DEQ policy for SW screening (2x acute)
Total Recoverable Zinc	-	NL	-	1/Year	Added in accordance with the DEQ policy for SW screening (2x acute)

Effluent Monitoring Changes for Outfalls 004

Parameter	Limitations		Monitoring Requirements		Rationale
	From	To	From	To	
Total Nitrogen	-	NL	-	1/Year	Added in accordance with the DEQ SW Benchmark Evaluation.
Total Kjeldahl Nitrogen (TKN)	-	NL	-	1/Year	Added in accordance with the DEQ SW Benchmark Evaluation.
Total Recoverable Iron	-	NL	-	1/Year	Added in accordance with the DEQ SW Benchmark Evaluation.
Copper	Dissolved	Total Recoverable	1/3M	1/3M	Revised in accordance with current PRO policy.
Cadmium	Dissolved	Total Recoverable	1/3M	1/3M	Revised in accordance with current PRO policy.
Zinc	Dissolved	Total Recoverable	1/3M	1/3M	Revised in accordance with current PRO policy.

Changes to Special Conditions

Special Condition		Rationale
From	To	
-	Part I.A.1.a [4]	Added footnote to reference compliance schedule.
-	Part I.A.4.a	Added “4/Month” definition
-	Part I.A.2.b, 5.c, 6.c, and 7	Revised Storm Water References to reflect reformatting of permit and updates to the storm water boilerplate language.
Part I.B.1	Part I.B.1	Additional Limitations and Monitoring Requirements. Revised in accordance with GM10-2003. Revised alternate disinfection frequency in accordance with GM10-2003.
Part I.C.1	Part I.C.1	Notification Levels. No change.
Part I.C.2	Part I.C.2	O&M Manual. Language revised in accordance with GM10-2003.
Part I.C.3	Part I.C.3	Licensed Operator Requirement. No change.
Part I.C.4	Part I.C.4	95% Capacity. Revised in accordance with GM10-2003 and added specific references to the Piedmont Regional Office.
Part I.C.5	Part I.C.5	CTC/CTO. Updated in accordance with GM10-2003 to reflect new procedures and GM07-2008, Amendment 2.

Special Condition		Rationale
From	To	
Part I.C.6	Part I.C.6	Reliability Class. No change.
Part I.C.7	Part I.C.7	Materials Handling and Storage. Revised in accordance with GM10-2003.
Part I.C.8	-	BMP. Removed in accordance with Water Permit Manager suggestion. BMPs are adequately addressed in the storm water language (Part I.E.).
Part I.C.9	-	Nutrient Enriched Waters Reopener. The NEW designation of the receiving stream in the WQS was repealed. Consequently, this condition is no longer relevant.
-	Part I.C.8	Nutrient Reopener. Added condition from GM07-2008 Amendment 2 because the facility discharges nutrients to the Chesapeake Bay.
Part I.C.10	Part I.C.9	Water Quality Reopener. No change.
Part I.C.11	Part.I.C.10	Compliance Reporting. Language revised in accordance with current VPDES Permit Manual (1/27/10). Added weekly average narrative to address the sewage treatment plant. Part d. was added in accordance with PRO Staff Meeting Decisions 7/27/10. Part e. was added to address interim DO limitations.
Part I.C.12	Part I.C.11	Sludge Use and Disposal. Updated in accordance with GM10-2003 to reflect the transfer of the Biosolids Program from VDH to DEQ.
Part I.C.13	Part I.C.12	Sludge Reopener. No change.
Part I.C.14	Part I.C.13	TMDL Reopener. No change.
Part I.C.15.	Part I.C.14	Closure Plan. Updated in accordance with GM10-2003.
Part I.C.16.	Part I.C.15	pH Excursions. No change
Part I.C.17	Part I.C.16	Chilled Water Discharge. No change.
Part I.C.18	Part I.C.10.e	Dissolved Oxygen Limitations. Moved to the compliance reporting condition (Part I.C.10).
-	Part I.C.17	Concept Engineering Report. Added in accordance with PRO-Staff Meeting Decision (7/27/10) and GM07-2008, Amendment 2.
-	Part I.C.18	Water Quality Criteria Monitoring. Added to assess changes in the manufacturing process, which are projected to be complete during the 2011 -2016 permit cycle.
-	Part I.C.19	Compliance Schedule. Added to allow the permittee a schedule in which to come in to compliance with the new dissolved oxygen limitations.
-	Part I.C.20	Ground Water Sampling Purge. Added per evaluation presented in Part 16 of the FS.
Part I.D	Part I.D	WET Testing. Updated in accordance with WET memo in Attachment G.
Part I.E-H	Part I.E	Storm Water Special Conditions. Updated language in accordance with GM10-2003 and the current ISWGP.

Changes in Response to Owner Comment (5/12/11 & 6/9/11). See Attachment K

Special Condition		Rationale	Date
From	To		
Part I.C.18	-	Form 2F Sampling. This condition was included in the initial draft to address several pollutants reported "believed present" in the EPA Form 2F application but not sampled. The condition was removed because sampling and analysis is not required by Form 2F. Furthermore, Whole Effluent Toxicity Testing required at Outfalls 901 and 004 should indicate if there is a need to further evaluate the pollutants noted in Form 2F.	5/19/11
Part I.C.19	Part I.C.18	Water Quality Criteria Monitoring. Reformatting	5/19/11
Part I.C.20	Part I.C.19	Compliance Schedule. Reformatting	5/19/11
Part I.C.21	Part I.C.20	Ground Water Sampling Purge. Reformatting	5/19/11
Part I.D.1.a	Part I.D.1.a	Removed Pimephales promelas from the annual acute testing requirements in recognition that toxicity was not observed during the 2006 cycle for this organism.	5/19/11
Part I.D.2	Part I.D.2	Revised 5th annual compliance period end date and submittal due date to be consistent with the previous 4 years. This change is appropriate in light of the delayed reissuance of this permit.	5/19/11
Part I.D.1.b	Part I.D.1.b	Language revised in accordance with owner request and Central Office concurrence (see Attachment G). "The test dilutions should be able to ~~determine compliance with~~ *assess toxicity at* an acute…"	6/22/11
Cover Page Owner Name: E.I. DuPont de Nemours & Company, Inc.	Cover Page Owner Name: DuPont Teijin Films	In accordance with the approved owner change forms processed by the DEQ in 2000. Documentation was submitted by DuPont Teijin staff 7/13/11.	7/13/11

Changes after Public Notice

Special Condition		Rationale	Date
From	To		
Cover Page Owner Name: E.I. DuPont de Nemours & Company, Inc.	Cover Page Owner Name: Du Pont Teijin Films U.S. Limited Partnership (DBA DuPont Teijin Films)	In accordance with written verification of the legal owner name as registered with the VA-SCC received 9/12/11.	9/13/11

21. Variances/Alternate Limits or Conditions: None.

22. Public Notice Information required by 9 VAC 25-31-280 B:
Comment period Start Date: 7/30/11 End Date: 8/29/11
Publication in *Richmond Times Dispatch* Dates: 7/30/11 & 8/6/11

All pertinent information is on file and may be inspected, and copied by contacting Emilee Carpenter at Virginia DEQ-Piedmont Regional Office, 4949-A Cox Road, Glen Allen VA 23060, (804) 527-5072, e-mail emilee.carpenter@deq.virginia.gov; Fax: 804/527-5106.

DEQ accepts comments and requests for public hearing by e-mail, fax or postal mail. All comments and requests must be in writing and be received by DEQ during the comment period. Submittals must include the names, mailing addresses and telephone numbers of the commenter/requester and of all persons represented by the commenter/requester. A request for public hearing must also include: 1) The reason why a public hearing is requested. 2) A brief, informal statement regarding the nature and extent of the interest of the requester or of those represented by the requester, including how and to what extent such interest would be directly and adversely affected by the permit. 3) Specific references, where possible, to terms and conditions of the permit with suggested revisions. A public hearing may be held, including another comment period, if public response is significant, based on individual requests for a public hearing, and there are substantial, disputed issues relevant to the permit. The public may review the draft permit and application at the DEQ Piedmont Regional Office by appointment or may request copies of the documents from the contact person listed above.

23. Additional Comments:

Previous Board Action: None

Staff Comments:

In 1990 on its own initiative, this facility installed groundwater monitoring wells in order to conduct a groundwater contamination investigation in the vicinity of the hot well and tank farm. Groundwater monitoring indicated groundwater impacts from process chemicals in the tank farm area, pack room area, and in the production wells which prompted the facility to notify DEQ. Since its initial investigation, the facility has taken steps to eliminate potential sources of groundwater pollution including: replacing a cracked concrete sump; maintaining buried conduits, and catch basins, and the concrete containment system for the above-ground tanks in the tank farm; and installing containment walls around the hot well to contain any overflows. Also, note that the above–ground tanks are elevated in order to facilitate the discovery of any leaks. Over the last fifteen years of the monitoring program, contaminant concentrations were significantly reduced or were reported as non-detectable. Since the initial contamination sources were eliminated and monitoring showed no increase in contaminant levels for several years, DEQ staffed discontinued the monitoring program in the 2006 permit reissuance.

A facility is not eligible for monitoring reduction consideration if any enforcement actions were taken within three years of the reissuance. Two Warning Letters were issued to DuPont Teijin on July 28, 2010, and September 28, 2010. Consequently, the facility is not eligible for reduced monitoring.

The permit expired prior to reissuance due to internal processing delays. The permit was administratively continued.

Permit fees are up-to-date. Annual fees were deposited September 9, 2010.

The DEQ Planning Group has reviewed the draft permit and determined that the discharge is in conformance with the existing planning documents for the area.

The discharge is not controversial.

The permittee is registered for eDMR participation as of 6/28/11.

DuPont Teijin is not currently a participant in the Virginia Environmental Excellence Program (VEEP).

DuPont Teijin is permitted as a Categorical Industrial User with the Hopewell Regional Wastewater Treatment Facility. Permit Number 24, effective September 1, 2009 through August 31, 2014, authorizes discharge of 1) distillation boiler wash water from the Polymer Plant, 2) sanitary sludge, 3) latex coating wastewater and sump solids from the Film Plant aqueous film coating operations, and 4) untreated or partially treated wastewater from DuPont Teijin's other plant processes or wastewater treatment tanks during situations when the treatment plant is upset or unable to properly treat the waste.

Owner Comment: See **Attachment K** for a copy of owner comments and agency responses regarding the draft permit.

Public Comment: The Crater PDC commented in favor of the project, stating that it "find[s] the proposal to be in full accord with the Crater Planning District Commission's environmental policy and directives." No other comments were received.

Other Agency Comments:

The application was sent to VDH-ODW. In a response dated January 26, 2011, VDH commented that the raw water intake for the Virginia American – Hopewell waterworks is located 10.8 miles downstream from the primary discharge point through the main river channel and 5.7 miles downstream from the primary discharge point through Turkey Island Cutoff. VDH-ODW did not express an objection to the discharge, but recommended a minimum Reliability Class I for this facility. VDH did not request review of the Draft Permit.

As required by the 2007 MOU between VDEQ, VDGIF, VDCR, and USFWS, a DCR threatened and endangered species screening was conducted for this permit reissuance. In a response dated February 15, 2011 DCR indicated that both Bald Eagles and Atlantic Sturgeon were documented within the vicinity of the discharge. Due to the legal status of the Bald eagle, DCR recommended further coordination with VDGIF. In response to DCR's recommendation, DEQ indicated that the facility has existed for many years and the site footprint is not being expanded, nor is any new activity taking place. Therefore, the reissuance of this permit is not expected to pose any new impacts to the state threatened bald eagle population. Furthermore, the permit is written to protect aquatic life and thereby should not contribute to any loss in food supply. Consequently, further coordination was not pursued. DCR made no recommendations to address the presence of Atlantic Sturgeon. This permit is written with limitations that protect against aquatic toxicity. Compliance with this permit should not contribute to or cause a threat to the Atlantic Sturgeon or its habitat. See **Attachment I.**

EPA reviewed the draft permit concurrent with public notice and responded 8/26/11 with no comments.

24. 303(d) Listed Segments (TMDL): During the 2010 305(b)/303(d) Water Quality Assessment, the segment was assessed as a Category 5A water ("A Water Quality Standard is not attained. The water is impaired or threatened for one or more designated uses by a pollutant(s) and requires a TMDL (303d list).") The applicable fact sheets are attached. The Aquatic Life Use is impaired due to inadequate submerged aquatic vegetation (SAV), chlorophyll a exceedance, and violation of the 30-day mean Open Water summer dissolved oxygen criteria; in addition, mercury is considered a non-impairing observed effect due to exceedance of a sediment screening value. The Recreation Use is impaired due to *E. coli*. The Fish Consumption Use is impaired due to a VDH fish advisory for PCBs; mercury and kepone are observed effects. The Wildlife Use is fully supporting.

Low submerged aquatic vegetation is typically associated with sediment and nutrients. The Chesapeake Bay TMDL (approved by the EPA on 12/29/10) addresses nutrients and TSS. An aggregate allocation was assigned to facilities in the James based on existing loadings. Given the TMDL WLA and the permit's conformance with the TMDL, it is staff's best professional judgment that discharges in accordance with this permit will neither cause nor contribute to the observed SAV impairment. The chlorophyll a impairment is also associated with nutrients. Given the TMDL WLAs for nutrients and the permit's conformance with the TMDL, it is staff's best professional judgment that discharges in accordance with this permit will neither cause nor contribute to the observed chlorophyll a impairment The Aquatic Life Use is also impaired due to violations of the 30-day mean Open Water summer dissolved oxygen criteria. The permit contains limitations for cBOD5, ammonia and dissolved oxygen in accordance with the Richmond Crater 208 Plan and the Water Quality Standards. Given these limitations, it is staff's best professional judgment that discharges in accordance with this permit will neither cause nor contribute to the observed violation of the Dissolved Oxygen Standards. The fish consumption use is impaired for PCBs. As indicated in Form 2C, PCBs were not observed in the process water effluent. Although the storm water has not been sampled, the permittee did not indicate that PCBs are believed present in the storm water discharges. The permittee has not yet performed low level PCB sampling in accordance with the voluntary monitoring efforts for the upcoming TMDL. The Recreation Use is impaired due to violations of the *E. coli* standard. The bacterial TMDL for the James River was approved b y EPA 11/04/10. The report assigns DuPont Teijin Films an *E. coli* wasteload allocation of 1.74E+12 cfu/year. A limitation of 126 N/100mL is assigned at internal outfall 102. This limitation assures compliance with the TMDL waste load allocation. Mercury and Kepone are observed effects in the receiving stream. As indicated in Form 2C, the effluent at

Outfall 001 was analyzed for Mercury and Kepone. The analyses resulted in less than an acceptable QL. Although the storm water has not been sampled, the permittee did not indicate that either mercury or kepone is believed present in the storm water discharges.

25. Summary of Attachments:

Attachment A: Flow Frequency Memo, Ambient Data, Tier Determination and 303(d) Status
Attachment B: Facility Diagrams and Summary of Operations
Attachment C: Facility Location Map
Attachment D: Site Inspection
Attachment E: Effluent Data
Attachment F: Effluent Limitation Analysis
Attachment G: WET Evaluation
Attachment H: NPDES Permit Rating Work Sheet
Attachment I: T&E Species Screening
Attachment J: OCPSF Guidelines (40 CFR 414 D & I)
Attachment K: Owner Comments on Draft Permit and Agency Responses.

ATTACHMENT A

Flow Frequency Memo, Ambient Data, Tier Determination and 303(d) Status

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY
Piedmont Regional Office
4949-A Cox Road Glen Allen, Virginia 23060

SUBJECT: Flow Frequency Determination / 303(d) Status
DuPont Teijin Films - VA0003077

TO: Emilee Carpenter

FROM: Jennifer Palmore, P.G.

DATE: November 2, 2010

COPIES: File

The DuPont Teijin Films facility is located in Chesterfield County near Bermuda Hundred, VA. The facility discharges to the James River via four outfalls. The rivermiles are as follows: 2-JMS086.36 for outfall 001/901, 2-JMS086.40 for outfall 002, and 2-JMS086.25 for outfalls 003 and 004. Flow frequencies have been requested at this site for use by the permit writer in developing effluent limitations for the VPDES permit.

The James River is tidally influenced at the discharge points. Flow frequencies cannot be determined for tidal waters; therefore, the previously determined dilution ratios should continue to be used to evaluate the effluent's impact on the water body. The rivers are designated as tidal freshwater; therefore the Aquatic Life Use freshwater criteria should be applied.

During the draft 2010 305(b)/303(d) Water Quality Assessment, the segment is assessed as a Category 5A water ("A Water Quality Standard is not attained. The water is impaired or threatened for one or more designated uses by a pollutant(s) and requires a TMDL (303d list).") The applicable fact sheets are attached. The Aquatic Life Use is impaired due to inadequate submerged aquatic vegetation (SAV), chlorophyll a exceedance, and violation of the 30-day mean Open Water summer dissolved oxygen criteria; in addition, mercury is considered a non-impairing observed effect due to exceedance of a sediment screening value. The Recreation Use is impaired due to E. coli. The Fish Consumption Use is impaired due to a VDH fish advisory for PCBs; mercury and kepone are observed effects. The Wildlife Use is fully supporting.

The bacterial TMDL for the James River is currently under development. The draft report assigns DuPont Teijin Films an E. coli wasteload allocation of 1.74E+12 cfu/year.

Water quality data from monitoring station 2-JMS087.01 is attached. The station is located on the James River at Buoy 137, which is less than 1 mile upstream of the outfalls.

The river is considered a Tier 1 water. The Richmond-Crater Water Quality Management Plan allocates BOD and ammonia in order to maintain a minimum dissolved oxygen of 5.0 mg/L in the river.

If you have any questions concerning this analysis, please let me know.

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Do Winkler	Fdt Do Optical	Salinity	Secchi Depth
2-JMS087.01	5/26/1974	S	1.00	22.78	7.30		6.50			
2-JMS087.01	6/7/1974	S	1.00	22.78	7.50		8.40			
2-JMS087.01	7/2/1974	S	1.00	26.67	7.50		8.00			
2-JMS087.01	7/26/1974	S	1.00	28.89	7.30		5.90			
2-JMS087.01	8/5/1974	S	1.00	28.33	7.10		6.70			
2-JMS087.01	9/26/1974	S	1.00	24.00	7.50		7.80			
2-JMS087.01	10/25/1974	S	1.00	17.22	7.50		10.19			
2-JMS087.01	5/1/1975	S	1.00	17.22	7.20		8.10			
2-JMS087.01	6/4/1975	S	1.00		7.30		7.50			
2-JMS087.01	6/24/1975	S	1.00	28.89	7.50		7.40			
2-JMS087.01	6/30/1975	S	1.00	27.22	7.20		7.00			
2-JMS087.01	7/28/1975	S	1.00	27.78	7.50		6.00			
2-JMS087.01	8/13/1975	S	1.00	28.33	7.50		6.50			
2-JMS087.01	8/16/1975	S	1.00	30.00	7.50		6.80			
2-JMS087.01	9/3/1975	S	1.00	26.11	7.50		7.20			
2-JMS087.01	10/1/1975	S	1.00	20.00	7.40		8.50			
2-JMS087.01	2/12/1976	S	1.00	5.56	7.50		12.59			
2-JMS087.01	3/11/1976	S	1.00	12.22	7.50		9.20			
2-JMS087.01	5/4/1976	S	1.00	20.50	7.60		8.60			
2-JMS087.01	6/7/1976	S	1.00	22.22	7.30		8.00			
2-JMS087.01	5/22/1978	S	1.00	20.50	8.00		8.30			
2-JMS087.01	6/15/1978	S	1.00	6.00	8.00		4.10			
2-JMS087.01	7/11/1978	S	1.00	28.50	7.80		5.10			
2-JMS087.01	8/3/1978	S	1.00	2.90	7.50		6.70			
2-JMS087.01	9/25/1978	S	1.00	7.00	8.30		7.40			
2-JMS087.01	12/12/1978	S	1.00	.00	7.50		9.70			
2-JMS087.01	4/24/1979	S	1.00	8.00	7.50		9.40			
2-JMS087.01	5/19/1980	S	1.00	22.00	8.00		8.00			
2-JMS087.01	7/16/1980	S	1.00	28.00	8.50		8.60			
2-JMS087.01	10/20/1980	S	1.00	19.00	8.20		9.00			
2-JMS087.01	7/27/1981	S	1.00	31.00	9.10		8.80			
2-JMS087.01	9/8/1981	S	1.00	27.00	7.40		5.30			
2-JMS087.01	11/16/1981	S	1.00	12.50	7.20		6.10			
2-JMS087.01	5/13/1982	S	1.00	23.00	7.50		6.60			
2-JMS087.01	6/24/1982	S	1.00	24.50	7.20		6.60			
2-JMS087.01	8/9/1982	S	1.00	29.50	7.10		5.30			
2-JMS087.01	10/28/1982	S	1.00	14.00	7.50		9.60			
2-JMS087.01	11/18/1982	S	1.00	11.50	6.70		9.20			0.6
2-JMS087.01	5/17/1983	S	1.00	20.50	7.80		8.30			
2-JMS087.01	6/28/1983	S	1.00	28.00	7.10		7.80			0.7
2-JMS087.01	8/16/1983	S	.91	28.00	7.90		7.60			0.2
2-JMS087.01	9/20/1983	S	.91	26.00	8.00		7.50			0.2
2-JMS087.01	9/27/1983	S	.91							0.2
2-JMS087.01	10/3/1983	S	.91	21.00	7.70		7.40			0.2
2-JMS087.01	10/3/1983	B	33.83	20.50	7.70		6.70			0.2
2-JMS087.01	7/7/1994	S	.30	32.10	7.70		7.50			
2-JMS087.01	7/14/1994	S	.30	31.46	7.15	5.29				
2-JMS087.01	7/28/1994	S	.30	30.00	7.13	5.58				
2-JMS087.01	8/11/1994	S	.30	30.05	7.63	8.87				
2-JMS087.01	8/18/1994	S	.30	29.10	7.25	6.04				
2-JMS087.01	8/30/1994	S	.30	28.30	7.20	7.27				
2-JMS087.01	9/8/1994	S	.30	26.50	7.62	8.80			.00	
2-JMS087.01	9/13/1994	S	.30	26.53	7.77	9.22				
2-JMS087.01	9/26/1994	S	.30	24.05	7.36	7.15				
2-JMS087.01	10/12/1994	S	.30	19.24	7.92	10.08				
2-JMS087.01	10/17/1994	S	.30	18.50	8.00	10.90				
2-JMS087.01	10/25/1994	S	.30	18.89	7.54	9.27				
2-JMS087.01	11/30/1994	S	.30	12.50	7.14	8.90			.00	
2-JMS087.01	12/6/1994	S	.30	12.90	7.15	8.70			.00	
2-JMS087.01	1/25/1995	S	.30	7.20	7.38	12.00			.00	
2-JMS087.01	2/27/1995	S	.30	9.30	7.49	11.40			.00	
2-JMS087.01	3/23/1995	S	.30	15.70	7.35	9.80				
2-JMS087.01	4/18/1995	S	.30	18.10	8.38	12.00			.00	
2-JMS087.01	5/3/1995	S	.30	18.13	7.24	8.28				
2-JMS087.01	5/18/1995	S	.30	22.67	7.08	7.58				
2-JMS087.01	5/23/1995	S	.30	24.50	7.39	8.80			.00	
2-JMS087.01	6/1/1995	S	.30	25.15	7.03	7.77				
2-JMS087.01	6/20/1995	S	.30	26.40	7.38	8.60				
2-JMS087.01	7/18/1995	S	.30	31.10	7.10	7.20			.00	
2-JMS087.01	7/31/1995	S	.30	32.57	7.54	5.96			.00	
2-JMS087.01	8/23/1995	S	.30	30.80	7.92	8.40				

2-JMS087.01	8/28/1995	S	.30	29.35	6.56	4.90				
2-JMS087.01	9/11/1995	S	.30	27.88	6.49	6.20				
2-JMS087.01	9/21/1995	S	.30	24.80	7.41	6.70			.00	
2-JMS087.01	10/5/1995	S	.30	23.65	7.29	6.82				
2-JMS087.01	10/19/1995	S	.30	20.80	7.35	8.80			.00	
2-JMS087.01	10/24/1995	S	.30	16.33	7.14	9.35				
2-JMS087.01	11/20/1995	S	.30	8.47	7.18	11.41			.00	
2-JMS087.01	12/14/1995	S	.30	5.97	7.25	12.38			.00	
2-JMS087.01	1/29/1996	S	.30	4.40	7.11	13.36			.00	
2-JMS087.01	2/20/1996	S	.30	5.00	7.23	12.85			.00	
2-JMS087.01	3/25/1996	S	.30	9.39	7.18	11.78			.00	
2-JMS087.01	4/29/1996	S	.30	19.72	7.75	9.49			.00	
2-JMS087.01	5/6/1996	S	.30	21.92	8.32	8.24				
2-JMS087.01	5/15/1996	S	.30	20.66	7.56	8.98			.00	
2-JMS087.01	5/28/1996	S	.30	21.85	7.11	7.12				
2-JMS087.01	6/3/1996	S	.30	22.02	7.68	8.96				
2-JMS087.01	6/12/1996	S	.30	26.69	7.28	7.42				
2-JMS087.01	6/18/1996	S	.30	28.90	7.36	7.99			.00	
2-JMS087.01	7/1/1996	S	.30	29.62	7.41	7.00				
2-JMS087.01	7/15/1996	S	.30	29.14	7.19	6.75				
2-JMS087.01	7/23/1996	S	.30	30.06	7.07	6.95			.00	
2-JMS087.01	8/1/1996	S	.30	29.52	7.10	6.07				
2-JMS087.01	8/15/1996	S	.30	26.25	7.16	6.85				
2-JMS087.01	8/20/1996	S	.30	28.65	7.43	7.50			.00	
2-JMS087.01	9/16/1996	S	.30	22.93	7.35	7.50				
2-JMS087.01	9/24/1996	S	.30	21.80	7.52	8.18			.00	
2-JMS087.01	9/30/1996	S	.30	22.23	7.62	7.92				
2-JMS087.01	10/9/1996	S	.30	17.60	7.51	8.82				
2-JMS087.01	10/22/1996	S	.30	16.55	7.17	8.45			.00	
2-JMS087.01	10/30/1996	S	.30	18.07	7.30	8.63				
2-JMS087.01	11/19/1996	S	.30	8.04	7.07	12.28			.00	
2-JMS087.01	12/10/1996	S	.30	5.50	6.83	12.60			.00	
2-JMS087.01	1/21/1997	S	.30	2.25	6.80	14.02			.00	
2-JMS087.01	2/18/1997	S	.30	6.80	6.94	14.20			.00	
2-JMS087.01	3/18/1997	S	.30	11.24	7.56	11.29			.00	
2-JMS087.01	4/22/1997	S	.30	15.44	7.73	10.34			.00	
2-JMS087.01	5/21/1997	S	.30	22.80	7.62	8.42				
2-JMS087.01	5/27/1997	S	.30	22.76	7.37	6.84				
2-JMS087.01	5/28/1997	S	.30	22.72	7.40	7.75			.00	
2-JMS087.01	6/3/1997	S	.30	23.42	7.10	7.12				
2-JMS087.01	6/23/1997	S	.30	29.77	7.89	7.90				
2-JMS087.01	6/24/1997	S	.30	31.13	8.16	8.19			.00	
2-JMS087.01	7/9/1997	S	.30	30.98	7.47	6.10				
2-JMS087.01	7/15/1997	S	.30	31.24	7.76					
2-JMS087.01	7/23/1997	S	.30	30.67	7.20					
2-JMS087.01	8/7/1997	S	.30	29.28	7.32	6.77				
2-JMS087.01	8/19/1997	S	.30	30.36	7.50	6.86			.00	
2-JMS087.01	8/21/1997	S	.30	30.41	7.23	6.14				
2-JMS087.01	9/4/1997	S	.30	27.63	7.77	7.50				
2-JMS087.01	9/23/1997	S	.30	26.04	7.67	7.85				
2-JMS087.01	10/2/1997	S	.30	22.07	7.71	8.15				
2-JMS087.01	10/20/1997	S	.30	19.95	7.44	7.42				
2-JMS087.01	10/21/1997	S	.30	19.74	7.39	7.16				
2-JMS087.01	11/18/1997	S	.30	10.46	7.32	10.41				
2-JMS087.01	12/10/1997	S	.30	7.92	7.37	11.08				
2-JMS087.01	1/21/1998	S	.30	6.69	7.56	12.00				
2-JMS087.01	2/18/1998	S	.30	7.76	7.03	11.88				
2-JMS087.01	3/17/1998	S	.30	7.96	7.46	12.60				
2-JMS087.01	4/21/1998	S	.30	15.82	7.40	10.60				
2-JMS087.01	5/18/1998	S	.30	22.45	7.76	8.80				
2-JMS087.01	5/19/1998	S	.30	23.64	7.80	9.00				
2-JMS087.01	5/27/1998	S	.30	24.64	7.87	7.90				
2-JMS087.01	6/17/1998	S	.30	26.79	7.91	7.96				
2-JMS087.01	6/23/1998	S	.30	29.23	7.96	9.12				
2-JMS087.01	6/30/1998	S	.30	31.27	7.48	6.60				
2-JMS087.01	7/14/1998	S	.30	30.40	7.62	8.90				
2-JMS087.01	7/21/1998	S	.30	32.20	8.58	9.39				
2-JMS087.01	7/28/1998	S	.30	31.90	7.62	7.40				
2-JMS087.01	8/11/1998	S	.30	31.36	7.62	6.63				
2-JMS087.01	8/18/1998	S	.30	30.80	7.71	7.80				
2-JMS087.01	8/25/1998	S	.30	31.14	8.01	7.25				
2-JMS087.01	9/14/1998	S	.30	27.54	8.60	9.61				

2-JMS087.01	9/22/1998	S	.30	28.35	8.21	7.68				
2-JMS087.01	9/29/1998	S	.30	27.43	7.80	7.40				
2-JMS087.01	10/13/1998	S	.30	22.45	7.78	7.80				
2-JMS087.01	10/20/1998	S	.30	20.64	7.85	9.11				
2-JMS087.01	10/26/1998	S	.30	18.93	7.74	9.40				
2-JMS087.01	11/18/1998	S	.30	14.00	7.68	10.85			.20	
2-JMS087.01	12/15/1998	S	.30	12.46	7.19	10.63				
2-JMS087.01	1/19/1999	S	.30	7.24	7.24	11.90			.10	
2-JMS087.01	2/23/1999	S	.30	8.25	7.28	11.77			.00	
2-JMS087.01	3/23/1999	S	.30	10.67	6.97	10.67				
2-JMS087.01	4/20/1999	S	.30	18.80	7.75	9.03				
2-JMS087.01	5/20/1999	S	.30	22.10	7.34	8.30				
2-JMS087.01	5/25/1999	S	.30	23.60	7.41	7.40				
2-JMS087.01	6/7/1999	S	.30	28.36	7.82	7.60				
2-JMS087.01	6/21/1999	S	.30	25.47	7.16	7.05				
2-JMS087.01	6/22/1999	S	.30	24.90	7.25	7.78			.00	
2-JMS087.01	7/7/1999	S	.30	32.69	7.55	6.86				
2-JMS087.01	7/20/1999	S	.30	31.84	7.77	8.42				
2-JMS087.01	7/21/1999	S	.30	31.34	7.70	7.10				
2-JMS087.01	8/10/1999	S	.30	29.60	7.84	7.28				
2-JMS087.01	8/17/1999	S	.30	32.17	7.88	8.42			.20	
2-JMS087.01	8/31/1999	S	.30	26.81	7.55	7.05			.00	
2-JMS087.01	9/13/1999	S	.30	25.97	7.44	7.33				
2-JMS087.01	9/21/1999	S	.30	22.28	6.88	8.00			.00	
2-JMS087.01	9/29/1999	S	.30	22.60	7.03	8.00			.00	
2-JMS087.01	10/13/1999	S	.30	20.29	7.20	8.08				
2-JMS087.01	10/26/1999	S	.30	16.00	7.36	9.40			.00	
2-JMS087.01	10/28/1999	S	.30	15.95	7.28	9.07			.00	
2-JMS087.01	11/18/1999	S	.30	12.70	7.64	11.70			.10	
2-JMS087.01	12/21/1999	S	.30	8.91	7.33	12.00				
2-JMS087.01	1/18/2000	S	.30	5.96	7.14	11.80			.00	
2-JMS087.01	2/23/2000	S	.30	8.50	7.13	11.77			.00	
2-JMS087.01	3/28/2000	S	.30	14.60	7.22	9.40			.00	
2-JMS087.01	4/24/2000	S	.30	17.40	7.11	8.90			.00	
2-JMS087.01	5/1/2000	S	.30	16.82	7.26	9.24			.00	
2-JMS087.01	5/22/2000	S	.30	25.65	7.19	6.25			.00	
2-JMS087.01	5/23/2000	S	.30	25.30	7.24	5.98			.10	
2-JMS087.01	6/5/2000	S	.30	25.00	7.45	8.30			.00	
2-JMS087.01	6/20/2000	S	.30	30.30	7.51	6.10				
2-JMS087.01	6/22/2000	S	.30	30.35	7.49	6.77			.00	
2-JMS087.01	7/11/2000	S	.30	29.67	8.19	8.36			.00	
2-JMS087.01	7/18/2000	S	.30	30.44	8.07	8.49			.10	
2-JMS087.01	7/26/2000	S	.30	26.85	7.22	6.23			.00	
2-JMS087.01	8/7/2000	S	.30	29.80	7.70	7.83			.00	
2-JMS087.01	8/22/2000	S	.30	29.00	8.14	8.70			.10	
2-JMS087.01	8/23/2000	S	.30	28.31	8.03	8.31				
2-JMS087.01	9/13/2000	S	.30	26.60	7.47	8.53			.00	
2-JMS087.01	9/26/2000	S	.30	22.30	7.60	7.39			.00	
2-JMS087.01	10/2/2000	S	.30	20.71	7.51	8.12			.00	
2-JMS087.01	10/16/2000	S	.30	20.79	7.94	9.87			.00	
2-JMS087.01	10/24/2000	S	1.00	19.90	8.61	10.70			.10	
2-JMS087.01	10/30/2000	S	.30	19.42	7.69	8.74			.00	
2-JMS087.01	1/23/2001	S	.30	5.18	6.86	12.41			.00	
2-JMS087.01	2/20/2001	S	.30	9.90	7.66	11.70			.10	
2-JMS087.01	3/27/2001	S	.30	10.40	7.11	11.60			.10	
2-JMS087.01	4/24/2001	S	.30	21.04	7.77	9.80			.00	
2-JMS087.01	5/7/2001	S	.30	23.45	7.58	7.63				
2-JMS087.01	5/30/2001	S	.30	20.00	7.40	8.50				
2-JMS087.01	6/13/2001	S	.30	28.78	7.49	7.73			.00	
2-JMS087.01	6/19/2001	S	.30	29.07	7.34	7.44			.10	
2-JMS087.01	6/28/2001	S	.30	30.79	7.48	8.18				
2-JMS087.01	7/5/2001	S	.30	30.95	7.32	7.27				
2-JMS087.01	7/24/2001	S	.30	30.58	7.51	7.59			.00	
2-JMS087.01	7/30/2001	S	.30	26.35	7.24	6.87				
2-JMS087.01	8/6/2001	S	.30	30.33	8.12	7.76				
2-JMS087.01	8/21/2001	S	.30	30.16	7.47	6.62			.10	
2-JMS087.01	8/23/2001	S	.30	30.40	7.42	6.43				
2-JMS087.01	9/18/2001	S	.30	24.26	8.46	9.37			.20	
2-JMS087.01	10/16/2001	S	.30	20.63	8.38	10.38			.30	
2-JMS087.01	11/27/2001	S	.30	15.54	7.72	9.96			.00	
2-JMS087.01	1/22/2002	S	.30	9.57	7.00	11.58			.00	
2-JMS087.01	2/19/2002	S	.30	10.86	7.59	10.17			.17	

2-JMS087.01	3/19/2002	S	.30	14.39	7.45	8.46			.16	
2-JMS087.01	4/16/2002	S	.30	22.42	8.49	11.38			.11	
2-JMS087.01	5/30/2002	S	.30	28.34	8.75	11.01			.00	
2-JMS087.01	6/25/2002	S	.30	30.44	7.64				.00	
2-JMS087.01	7/23/2002	S	.30	30.94	7.87	7.07			.00	
2-JMS087.01	8/13/2002	S	.30	32.60	8.14	7.97			.00	
2-JMS087.01	9/24/2002	S	.30	26.94	7.78	7.80			.00	
2-JMS087.01	10/22/2002	S	.30	19.35	7.49	6.63			.00	
2-JMS087.01	11/19/2002	S	.30	11.05	6.97	12.31			.00	
2-JMS087.01	12/10/2002	S	.30	5.92	7.29	13.05			.00	
2-JMS087.01	1/21/2003	S	.30	4.01	7.42	13.64			.00	
2-JMS087.01	2/25/2003	S	.30	4.55	6.98	12.34			.00	
2-JMS087.01	3/18/2003	S	.30	11.72	7.52	10.78			.00	
2-JMS087.01	5/27/2003	S	.30	18.10	6.92	8.43			.00	
2-JMS087.01	6/24/2003	S	.30	22.58	7.55	8.40			.00	
2-JMS087.01	7/15/2003	S	.30	28.96	7.93	7.79			.00	
2-JMS087.01	8/26/2003	S	.30	30.37	8.02	8.23			.00	
2-JMS087.01	10/28/2003	S	.30	16.96	7.38	8.85			.00	
2-JMS087.01	11/18/2003	S	.30	11.28	7.52	9.99			.00	
2-JMS087.01	12/16/2003	S	.30	5.03	7.10	12.43			.00	
2-JMS087.01	2/25/2004	S	.30	7.58	7.59	12.16			.00	
2-JMS087.01	3/23/2004	S	.30	11.31	7.67	11.36			.00	
2-JMS087.01	4/20/2004	S	.30	18.09	7.28	9.60			.00	
2-JMS087.01	5/18/2004	S	.30		7.39					
2-JMS087.01	6/15/2004	S	.30	27.01	7.49	8.06			.00	
2-JMS087.01	7/20/2004	S	.30	31.19	8.02	7.28			.00	
2-JMS087.01	8/17/2004	S	.30	25.30	7.10	6.55			.00	
2-JMS087.01	9/21/2004	S	.30	21.38	7.15	8.35			.00	
2-JMS087.01	10/19/2004	S	.30	17.97	7.56	8.81			.00	
2-JMS087.01	11/16/2004	S	.30	10.68	7.28	10.67			.00	
2-JMS087.01	12/14/2004	S	.30	8.89	7.60	11.18			.00	
2-JMS087.01	1/26/2005	S	.30	2.92	7.36	13.24			.00	0.5
2-JMS087.01	2/15/2005	S	.30	9.43	7.54	11.49			.00	
2-JMS087.01	3/22/2005	S	.30	11.79	7.67	11.35			.00	
2-JMS087.01	4/19/2005	S	.30	17.20	7.79	11.35			.00	
2-JMS087.01	5/24/2005	S	.30	21.57	7.26	7.40			.00	
2-JMS087.01	6/21/2005	S	.30	27.70	7.42	6.64			.00	
2-JMS087.01	7/19/2005	S	.30	32.39	7.95	8.47			.00	
2-JMS087.01	8/23/2005	S	.30	31.90	7.53	6.61			.00	
2-JMS087.01	9/20/2005	S	.30	29.30	7.74	6.91			.00	
2-JMS087.01	10/18/2005	S	.30	19.77	7.47	8.13			.00	
2-JMS087.01	11/15/2005	S	.30	16.20	8.08	10.48			.00	
2-JMS087.01	12/21/2005	S	.30	5.22	7.28	12.17			.00	
2-JMS087.01	1/17/2006	S	.30	6.60	7.26	12.35			.00	
2-JMS087.01	2/21/2006	S	.30	7.90	6.72	12.63			.00	
2-JMS087.01	3/20/2006	S	.30	15.00	8.00	10.60				
2-JMS087.01	4/26/2006	S	.30	21.50	7.60	7.80			.00	
2-JMS087.01	5/15/2006	S	.30	22.20	7.50	8.00			.00	
2-JMS087.01	6/21/2006	S	.30	28.10	8.10	8.20			.00	
2-JMS087.01	7/24/2006	S	.30	31.00	7.80	6.40			.00	
2-JMS087.01	8/22/2006	S	.30	29.50	8.00	7.70			.00	
2-JMS087.01	9/26/2006	S	.30	24.90	7.60	7.50			.00	
2-JMS087.01	10/30/2006	S	.30	13.00	7.50	9.50			.00	
2-JMS087.01	11/15/2006	S	.30	13.50	7.20	9.10			.00	
2-JMS087.01	1/24/2007	S	.30	6.60	8.00	11.60			.00	
2-JMS087.01	2/20/2007	S	.30	3.60	7.40	13.00			.00	
2-JMS087.01	3/19/2007	S	.30	9.40	6.80	11.20			.00	
2-JMS087.01	4/30/2007	S	.30	20.80	7.60	9.10			.00	0.9
2-JMS087.01	5/30/2007	S	.30	27.70	7.50	6.60			.00	
2-JMS087.01	6/18/2007	S	.30	29.30	8.30	9.70			.00	
2-JMS087.01	7/23/2007	S	.30	30.00	7.90	7.40		7.80	.00	
2-JMS087.01	8/20/2007	S	.30	29.50	7.20	4.50		4.90	.00	
2-JMS087.01	9/24/2007	S	.30	27.00	8.60	10.10			.00	
2-JMS087.01	10/22/2007	S	.30	23.10	8.70	10.80			.00	
2-JMS087.01	11/13/2007	S	.30	16.10	7.70	8.80			.00	
2-JMS087.01	12/10/2007	S	.30	11.70	7.60	10.60			.00	
2-JMS087.01	1/23/2008	S	.30	7.10	7.20	11.40			.00	
2-JMS087.01	2/14/2008	S	.30	9.30	6.90	10.50			.00	
2-JMS087.01	3/18/2008	S	.30	12.70	6.70	10.00			.00	
2-JMS087.01	4/15/2008	S	.30	16.80	6.60	8.70			.00	
2-JMS087.01	5/22/2008	S	.30	20.80	7.50	8.60			.00	
2-JMS087.01	6/17/2008	S	.30	31.50	7.80	7.30			.00	

2-JMS087.01	7/15/2008	S	.30	29.10	7.80	6.30			.00	
2-JMS087.01	9/16/2008	S	.30	27.10	7.20	5.30			.00	
2-JMS087.01	10/21/2008	S	.30	19.60	7.50	8.20				
2-JMS087.01	11/24/2008	S	.30	8.80	7.90	11.30			.00	
2-JMS087.01	12/9/2008	S	.30	7.50	8.20	12.10			.00	
2-JMS087.01	1/21/2009	S	.30	3.90	7.30	12.50			.00	
2-JMS087.01	2/19/2009	S	.30	11.10	5.40	9.90			.00	
2-JMS087.01	3/17/2009	S	.30	12.00	7.40	9.90			.00	
2-JMS087.01	4/16/2009	S	.30	14.90	7.50	10.20				
2-JMS087.01	4/30/2009	S	.30	22.10	8.20	7.30				
2-JMS087.01	5/19/2009	S	.30	20.00	7.70	9.00				
2-JMS087.01	5/19/2009	S	.30	20.00	7.70	9.00				
2-JMS087.01	6/16/2009	S	.30	27.50	7.40	7.00				
2-JMS087.01	7/21/2009	S	.30	28.90	7.50	7.60				
2-JMS087.01	8/18/2009	S	.30	30.80	8.50	7.60				
2-JMS087.01	9/15/2009	S	.30	25.90	8.20	8.90				
2-JMS087.01	10/28/2009	S	.30	18.80	7.90	9.00				
2-JMS087.01	11/9/2009	S	.30	15.50	7.50	9.60				
2-JMS087.01	12/8/2009	S	.30	7.60	6.90	11.70				
2-JMS087.01	1/25/2010	S	.30	6.50	7.50	11.00				
2-JMS087.01	2/17/2010	S	.30	4.40	7.40	12.00				
2-JMS087.01	3/4/2010	S	.30	6.80	7.50	12.50				
2-JMS087.01	4/6/2010	S	.30	18.70	7.40	9.30				
2-JMS087.01	5/4/2010	S	.30	23.50	7.50	7.40				
2-JMS087.01	6/2/2010	S	.30	28.10	7.20	6.20				
2-JMS087.01	7/7/2010	S	.30	32.10	8.90	10.80				
2-JMS087.01	8/3/2010	S	.30	30.30	7.90	6.90				
2-JMS087.01	9/8/2010	S	.30	28.30	8.60	8.70				
2-JMS087.01	10/5/2010	S	.30	19.10	7.60			8.30		
90th Percentile				**30.6**	**8.0**					
10th Percentile				**7.6**	**7.1**					

					00900	
					HARDNESS, TOTAL (MG/L AS CACO3)	
Sta Id	Collection Date Time	Depth Desc	Depth	Container Id Desc	Value	Com Code
2-JMS087.01	07/07/1994 15:00	S	0.3	R	62.0	
2-JMS087.01	08/11/1994 14:50	S	0.3	R	59.0	
2-JMS087.01	09/08/1994 14:35	S	0.3	R	65.0	
2-JMS087.01	10/17/1994 15:20	S	0.3	R	71.0	
2-JMS087.01	11/30/1994 14:45	S	0.3	R	65.0	
2-JMS087.01	12/06/1994 15:40	S	0.3	R	71.0	
2-JMS087.01	01/25/1995 14:30	S	0.3	R	50.0	
2-JMS087.01	02/27/1995 14:45	S	0.3	R	65.0	
2-JMS087.01	03/23/1995 15:30	S	0.3	R	60.0	
2-JMS087.01	04/18/1995 15:10	S	0.3	R	79.0	
2-JMS087.01	05/23/1995 14:50	S	0.3	R	40.0	
2-JMS087.01	06/20/1995 15:20	S	0.3	R	60.0	
2-JMS087.01	07/18/1995 15:00	S	0.3	R	51.0	
2-JMS087.01	08/23/1995 15:30	S	0.3	R	80.0	
2-JMS087.01	09/21/1995 14:25	S	0.3	R	100.0	
2-JMS087.01	10/19/1995 15:00	S	0.3	R	92.0	
2-JMS087.01	11/20/1995 15:15	S	0.3	R	60.0	
2-JMS087.01	12/14/1995 15:00	S	0.3	R	55.0	
2-JMS087.01	01/29/1996 15:00	S	0.3	R	26.0	
2-JMS087.01	02/20/1996 14:50	S	0.3	R	60.0	
2-JMS087.01	03/25/1996 14:45	S	0.3	R	52.0	
2-JMS087.01	04/29/1996 11:55	S	0.3	R	60.0	
2-JMS087.01	05/15/1996 14:10	S	0.3	R	62.0	
2-JMS087.01	06/18/1996 14:30	S	0.3	R	48.0	
2-JMS087.01	07/23/1996 15:15	S	0.3	R	59.0	
2-JMS087.01	08/20/1996 14:30	S	0.3	R	84.0	
2-JMS087.01	09/24/1996 14:30	S	0.3	R	67.0	
2-JMS087.01	10/22/1996 14:10	S	0.3	R	64.0	
2-JMS087.01	11/19/1996 14:50	S	0.3	R	54.0	
2-JMS087.01	12/10/1996 15:00	S	0.3	R	47.7	
2-JMS087.01	01/21/1997 16:10	S	0.3	R	60.3	
2-JMS087.01	02/18/1997 15:20	S	0.3	R	43.3	
2-JMS087.01	03/18/1997 15:00	S	0.3	R	55.1	
2-JMS087.01	04/22/1997 15:10	S	0.3	R	67.7	
2-JMS087.01	05/28/1997 15:45	S	0.3	R	65.9	
2-JMS087.01	06/24/1997 15:00	S	0.3	R	64.9	
2-JMS087.01	07/15/1997 15:00	S	0.3	R	73.4	
2-JMS087.01	08/19/1997 15:00	S	0.3	R	70.0	
2-JMS087.01	09/23/1997 14:45	S	0.3	R	71.8	
2-JMS087.01	10/21/1997 14:40	S	0.3	R	87.2	
2-JMS087.01	11/18/1997 15:00	S	0.3	R	67.6	
2-JMS087.01	12/10/1997 15:48	S	0.3	R	69.9	
2-JMS087.01	01/21/1998 15:30	S	0.3	R	42.6	
2-JMS087.01	02/18/1998 14:40	S	0.3	R	41.4	
2-JMS087.01	03/17/1998 15:10	S	0.3	R	44.3	
2-JMS087.01	04/21/1998 15:00	S	0.3	R	42.5	

2-JMS087.01	05/19/1998 15:10	S	0.3	R	43.2	
2-JMS087.01	06/23/1998 15:35	S	0.3	R	51.4	
2-JMS087.01	07/21/1998 14:50	S	0.3	R	62.3	
2-JMS087.01	08/18/1998 15:00	S	0.3	R	82.9	
2-JMS087.01	09/22/1998 17:10	S	0.3	R	81.4	
2-JMS087.01	10/20/1998 16:00	S	0.3	R	116.0	
2-JMS087.01	11/18/1998 15:00	S	0.3	R	101.0	
2-JMS087.01	12/15/1998 15:00	S	0.3	R	94.0	
2-JMS087.01	01/19/1999 15:00	S	0.3	R	82.0	
2-JMS087.01	02/23/1999 14:45	S	0.3	R	90.0	
2-JMS087.01	03/23/1999 15:00	S	0.3	R	52.0	
2-JMS087.01	04/20/1999 16:05	S	0.3	R	82.0	
2-JMS087.01	05/20/1999 15:00	S	0.3	R	52.0	
2-JMS087.01	06/22/1999 14:50	S	0.3	R	62.5	
2-JMS087.01	07/20/1999 16:00	S	0.3	R	85.7	
2-JMS087.01	08/17/1999 15:45	S	0.3	R	102.0	
2-JMS087.01	09/21/1999 10:00	S	0.3	R	39.3	
2-JMS087.01	11/18/1999 15:05	S	1	R	65.9	
2-JMS087.01	12/21/1999 14:45	S	0.3	R	66.8	
2-JMS087.01	01/18/2000 15:50	S	0.3	R	56.1	
2-JMS087.01	02/23/2000 13:50	S	0.3	R	44.0	
2-JMS087.01	03/28/2000 15:05	S	0.3	R	38.0	
2-JMS087.01	04/24/2000 15:15	S	0.3	R	37.0	
2-JMS087.01	05/23/2000 17:00	S	0.3	R	59.0	
2-JMS087.01	06/20/2000 15:40	S	0.3	R	70.0	
2-JMS087.01	07/18/2000 16:05	S	0.3	R	72.0	
2-JMS087.01	08/22/2000 14:55	S	0.3	R	80.2	
2-JMS087.01	09/26/2000 16:00	S	0.3	R	63.4	
2-JMS087.01	10/24/2000 15:00	S	1	R	80.2	
2-JMS087.01	11/28/2000 16:30	S	0.3	R	93.6	
2-JMS087.01	01/23/2001 13:45	S	0.3	R	69.3	
2-JMS087.01	02/20/2001 13:00	S	0.3	R	69.2	
2-JMS087.01	03/27/2001 14:15	S	0.3	R	38.0	
2-JMS087.01	04/24/2001 13:30	S	0.3	R	45.8	
2-JMS087.01	06/19/2001 13:25	S	0.3	R	50.3	
2-JMS087.01	07/24/2001 14:10	S	0.3	R	65.0	
2-JMS087.01	08/21/2001 15:00	S	0.3	R	86.3	
2-JMS087.01	09/18/2001 15:45	S	0.3	R	81.7	
2-JMS087.01	10/16/2001 14:30	S	0.3	R	30.0	
2-JMS087.01	11/27/2001 15:00	S	0.3	R	124.0	
2-JMS087.01	12/12/2001 14:00	S	0.3	R	149.0	
2-JMS087.01	01/22/2002 15:00	S	0.3	R	107.0	
2-JMS087.01	02/19/2002 14:50	S	0.3	R	73.2	
2-JMS087.01	03/19/2002 15:00	S	0.3	R	92.3	
2-JMS087.01	04/16/2002 15:15	S	0.3	R	72.8	
2-JMS087.01	05/30/2002 16:00	S	0.3	R	64.6	
2-JMS087.01	06/25/2002 14:50	S	0.3	R	81.3	
2-JMS087.01	07/23/2002 14:30	S	0.3	R	93.4	
2-JMS087.01	08/13/2002 15:15	S	0.3	R	121.0	
2-JMS087.01	09/24/2002 15:00	S	0.3	R	152.0	

2-JMS087.01	10/22/2002 15:00	S	0.3	R	143.0	
2-JMS087.01	11/19/2002 15:15	S	0.3	R	36.9	
2-JMS087.01	12/10/2002 14:30	S	0.3	R	91.4	
2-JMS087.01	01/21/2003 15:00	S	0.3	R	54.9	
2-JMS087.01	02/25/2003 10:18	S	0.3	R	50.1	
2-JMS087.01	03/18/2003 15:15	S	0.3	R	42.9	
2-JMS087.01	05/27/2003 15:51	S	0.3	R	40.9	
2-JMS087.01	06/24/2003 14:30	S	0.3	R	49.0	
2-JMS087.01	07/15/2003 14:45	S	0.3	R	51.5	
2-JMS087.01	08/26/2003 15:30	S	0.3	R	53.0	
2-JMS087.01	10/28/2003 15:10	S	0.3	R	66.5	
2-JMS087.01	11/18/2003 14:30	S	0.3	R	57.0	
2-JMS087.01	12/16/2003 14:45	S	0.3	R	46.0	
2-JMS087.01	02/25/2004 14:40	S	0.3	R	54.0	
2-JMS087.01	03/23/2004 14:40	S	0.3	R	60.7	
2-JMS087.01	04/20/2004 14:20	S	0.3	R	47.8	
2-JMS087.01	05/18/2004 14:30	S	0.3	R	66.0	
2-JMS087.01	06/15/2004 14:40	S	0.3	R	64.0	
2-JMS087.01	07/20/2004 14:20	S	0.3	R	57.8	
2-JMS087.01	08/17/2004 14:30	S	0.3	R	47.3	
2-JMS087.01	09/21/2004 14:15	S	0.3	R	38.4	
2-JMS087.01	10/19/2004 14:00	S	0.3	R	38.0	
2-JMS087.01	11/16/2004 14:15	S	0.3	R	42.0	
2-JMS087.01	12/14/2004 14:55	S	0.3	R	62.0	
2-JMS087.01	01/26/2005 14:30	S	0.3	R	56.0	
2-JMS087.01	02/15/2005 14:15	S	0.3	R	70.0	
2-JMS087.01	03/22/2005 15:00	S	0.3	R	154.0	
2-JMS087.01	04/19/2005 15:20	S	0.3	R	59.5	
2-JMS087.01	05/24/2005 14:30	S	0.3	R	54.0	
2-JMS087.01	06/21/2005 14:30	S	0.3	R	66.0	
2-JMS087.01	07/19/2005 14:40	S	0.3	R	80.0	
2-JMS087.01	08/23/2005 15:15	S	0.3	R	76.0	
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2-JMS087.01	10/18/2005 15:00	S	0.3	R	56.0	
2-JMS087.01	11/15/2005 14:05	S	0.3	R	72.0	
2-JMS087.01	12/21/2005 14:40	S	0.3	R	47.0	
2-JMS087.01	01/17/2006 14:30	S	0.3	R	55.0	
2-JMS087.01	02/21/2006 14:45	S	0.3	R	54.0	
2-JMS087.01	03/20/2006 15:00	S	0.3	R	73.0	
2-JMS087.01	04/26/2006 14:35	S	0.3	R	62.0	
2-JMS087.01	05/15/2006 14:45	S	0.3	R	60.0	
2-JMS087.01	07/24/2006 14:10	S	0.3	R	74.0	
2-JMS087.01	08/22/2006 14:50	S	0.3	R	88.0	
2-JMS087.01	09/26/2006 14:40	S	0.3	R	56.0	
2-JMS087.01	10/30/2006 14:50	S	0.3	R	62.0	
2-JMS087.01	11/15/2006 14:00	S	0.3	R	38.0	
2-JMS087.01	01/24/2007 14:20	S	0.3	R	60.0	
Average					**66.7**	

2010 Fact Sheets for 303(d) Waters

RIVER BASIN: James River Basin

HYDROLOGIC UNIT: 02080206

STREAM NAME: **James River**

TMDL ID: **G01E-01-BAC**

2010 IMPAIRED AREA ID: CB-JMSTFU

ASSESSMENT CATEGORY: 5A

TMDL DUE DATE: 2010

IMPAIRED SIZE: 6.2581 - Sq. Mi.

Watershed: VAP-G01E

INITIAL LISTING: 1996

UPSTREAM LIMIT: Fall Line (Mayos Bridge)

DOWNSTREAM LIMIT: Appomattox River

Estuarine James River from the fall line at Mayos Bridge downstream to the Appomattox River.

CLEAN WATER ACT GOAL AND USE SUPPORT:

Recreation Use - Not Supporting

IMPAIRMENT: E.coli

The James River from the fall line to the Appomattox River has been assessed as not supporting of the Recreation use support goal based on the results of a summer special study in the fall zone. The special study was designed to monitor the effects of summertime rain and combined sewer overflow (CSO) events on water quality in the James River and to monitor the effects of Richmond's CSO abatement efforts.

The segment has been included on the Impaired Waters list for fecal coliform since 1996. During the 2004 and 2006 cycles, the bacteria standard changed to E.coli for those stations with enough data. Some of the areas in this segment had converted to the E.coli standard, for others the fecal coliform standard was still in effect. During the 2008 cycle, the impairment was converted solely to E. coli. The TMDL for bacteria is due in 2010.

Bacteria impairment is noted at the following stations during the 2010 cycle:
2-JMS110.30
2-JMS104.16
2-JMS099.30

Although station 2-JMS087.01 is currently passing (5/50), the downstream extent will remain the same for this cycle due to the historical impairment and the marginal passing rate.

Farrar Gut was mistakenly combined with the mainstem in previous assessments. The stream is a separate waterbody and should not be included in the bacterial impairment, which only included the "estuarine James River".

IMPAIRMENT SOURCE: NPS - Urban, CSO

The source of the impairment in this section of the river is believed to be urban runoff from the tributary drainage basin and from combined sewer overflow events from the City of Richmond's combined sewer system.

The City is currently undertaking CSO abatement efforts. It is recommended that the ongoing CSO special study be continued to gauge the effects of CSO abatement efforts on water quality in this segment.

RECOMMENDATION: Problem Characterization

2010 Fact Sheets for 303(d) Waters

RIVER BASIN: James River Basin

HYDROLOGIC UNIT: 02080206

STREAM NAME: **James River**

TMDL ID: **G01E-02-CHLA**

2010 IMPAIRED AREA ID: CB-JMSTFU

ASSESSMENT CATEGORY: 5A

TMDL DUE DATE: 2010

IMPAIRED SIZE: 5.5117 - Sq. Mi.

Watershed: VAP-G01E

INITIAL LISTING: 2008

UPSTREAM LIMIT: Fall Line (Mayos Bridge)

DOWNSTREAM LIMIT: Appomattox River

Mainstem James River from the fall line at Mayos Bridge downstream to the JMSTFu/JMSTFl boundary at the Appomattox River.

CLEAN WATER ACT GOAL AND USE SUPPORT:

Aquatic Life Use - Not Supporting, Open Water Subuse - Not Supporting

IMPAIRMENT: Chlorophyll

The James River from the Appomattox River to the Chickahominy River was originally listed on the 1998 list as fully supporting but threatened of the Aquatic Life Use goal based on chlorophyll_a exceedances. During the 1998 cycle, EPA extended the segment upstream to the fall line and downgraded the river to not supporting the Aquatic Life Use, citing nutrient concerns.

In previous cycles, the mainstem James River had acceptable dissolved oxygen levels. In addition the entire tidal freshwater portion (fall line to just above the Chickahominy River) has good benthic community based on the results from the Chesapeake Bay Benthic Index of Biological Community; therefore the James River from the fall line to the oligohaline boundary was considered impaired solely for Nutrients/Eutrophication Biological Indicators (EPA Overlist).

A special site-specific chlorophyll standard for the mainstem James River was adopted during the 2008 cycle. The upper tidal freshwater segment exceeds both the spring and summer seasonal means.

Farrar Gut was mistakenly combined with the mainstem in previous assessments. The stream is a separate waterbody and should not be included in the chlorophyll a impairment, which only includes the mainstem James River.

IMPAIRMENT SOURCE: Point sources, Nonpoint Sources

The James River Tributary Strategy was developed to bring the river into attainment.

RECOMMENDATION: Problem Characterization

2010 Fact Sheets for 303(d) Waters

RIVER BASIN: James River Basin **HYDROLOGIC UNIT:** 02080206

STREAM NAME: **James River and Various Tributaries**

TMDL ID: **G01E-03-PCB** **2010 IMPAIRED AREA ID:** CB-JMSTFU

ASSESSMENT CATEGORY: 5A **TMDL DUE DATE:** 2014

IMPAIRED SIZE: ~325 - Stream mile **Watershed:** VAP-G01E

INITIAL LISTING: 2002

UPSTREAM LIMIT: Fall line

DOWNSTREAM LIMIT: Hampton Roads Bridge Tunnel

Estuarine James River from the fall line to the Hampton Roads Bridge Tunnel, including several tributaries listed below.

CLEAN WATER ACT GOAL AND USE SUPPORT:

Fish Consumption Use - Not Supporting

IMPAIRMENT: Fish Tissue - PCBs, VDH Fish Consumption Restriction

During the 2002 cycle, the James River from the Fall line to Queens Creek was considered not supporting of the Fish Consumption Use due to PCBs in multiple fish species at multiple DEQ monitoring locations.

During the 2004 cycle, a VDH Fish Consumption Restriction was issued from the fall line to Flowerdew Hundred and the segment was adjusted slightly to match the Restriction. In addition, in the 2004 cycle, the Chickahominy River from Walkers Dam to Diascund Creek was assessed as not supporting the Fish Consumption Use because the DEQ screening value for PCBs was exceeded in 3 species during sampling in 2001.

During the 2006 cycle, the VDH restriction was extended on 12/13/2004 to extend from the I-95 bridge downstream to the Hampton Roads Bridge Tunnel and include the tidal portions of the following tributaries:

Appomattox River up to Lake Chesdin Dam
Bailey Creek up to Route 630
Bailey Bay
Chickahominy River up to Walkers Dam
Skiffes Creek up to Skiffes Creek Dam
Pagan River and its tributary Jones Creek
Chuckatuck Creek
Nansemond River and its tributaries Bennett Creek and Star Creek
Hampton River
Willoughby Bay and the Elizabeth R. system (Western, Eastern, and Southern Branches and Lafayette R.) and tributaries St. Julian Creek, Deep Creek, and Broad Creek

The advisory was modified again on 10/10/2006 to add Poythress Run.

The impairments were combined. The TMDL for the lower extended portion is due in 2018.

Farrar Gut was mistakenly combined with the mainstem in previous assessments. The stream is a separate waterbody and is not included in the VDH Fish Consumption Advisory.

IMPAIRMENT SOURCE: Unknown

The source of the PCBs is considered unknown.

2010 Fact Sheets for 303(d) Waters

RIVER BASIN: James River Basin **HYDROLOGIC UNIT:** 02080206

STREAM NAME: **James River Tidal Freshwater (Upper) Estuary**

TMDL ID: **JMSTFU-DO-BAY** **2010 IMPAIRED AREA ID:** CB-JMSTFU

ASSESSMENT CATEGORY: 5A **TMDL DUE DATE:** 2010

IMPAIRED SIZE: 6.5749 - Sq. Mi. **Watershed:** VAP-G01E

INITIAL LISTING: 1998

UPSTREAM LIMIT: Fall line

DOWNSTREAM LIMIT: Tidal Freshwater/Oligohaline Boundary

The James River Tidal Freshwater Upper estuary, which extends from the fall line to approximately the Appomattox River, including tributaries.

CLEAN WATER ACT GOAL AND USE SUPPORT:

Aquatic Life Use - Not Supporting

IMPAIRMENT: Dissolved Oxygen

The mainstem James River from the Appomattox River to the Chickahominy River was originally listed on the 1998 list as fully supporting but threatened of the Aquatic Life Use goal based on chlorophyll_a exceedances. During the 1998 cycle, EPA extended the segment upstream to the fall line and downgraded the river to not supporting the Aquatic Life Use, citing nutrient concerns.

In previous cycles, the mainstem James River had acceptable dissolved oxygen levels. In addition the entire tidal freshwater portion (fall line to just above the Chickahominy River) has good benthic community based on the results from the Chesapeake Bay Benthic Index of Biological Community; therefore the James River from the fall line to the oligohaline boundary was considered impaired solely for Nutrients/Eutrophication Biological Indicators (EPA Overlist).

The CB water quality standards were implemented during the 2006 cycle. The 30-day dissolved oxygen criteria was met during the 2006 and 2008 cycles; however, during the 2010 cycle, the segment failed the summer 30-day Open Water dissolved oxygen criteria. The rest-of-year standard was met.

IMPAIRMENT SOURCE: Nonpoint Source, Point Source

The tributary strategy for the James River assigned sources and allocations.

RECOMMENDATION: Problem Characterization

2010 Fact Sheets for 303(d) Waters

RIVER BASIN: James River Basin **HYDROLOGIC UNIT:** 02080206

STREAM NAME: **James River Tidal Freshwater (Upper) Estuary**

TMDL ID: **JMSTFU-SAV-BAY** **2010 IMPAIRED AREA ID:** CB-JMSTFU

ASSESSMENT CATEGORY: 5A **TMDL DUE DATE:** 2010

IMPAIRED SIZE: 6.5998 - Sq. Mi. **Watershed:** VAP-G01E

INITIAL LISTING: 1998

UPSTREAM LIMIT: Fall line

DOWNSTREAM LIMIT: Tidal Freshwater/Oligohaline Boundary

The James River Tidal Freshwater Upper estuary, which extends from the fall line to approximately the Appomattox River, including tributaries.

CLEAN WATER ACT GOAL AND USE SUPPORT:

Aquatic Life Use - Not Supporting, Shallow Water Use - Not Supporting

IMPAIRMENT: Aquatic Macrophytes

The mainstem James River from the Appomattox River to the Chickahominy River was originally listed on the 1998 list as fully supporting but threatened of the Aquatic Life Use goal based on chlorophyll_a exceedances. During the 1998 cycle, EPA extended the segment upstream to the fall line and downgraded the river to not supporting the Aquatic Life Use, citing nutrient concerns.

In previous cycles, the mainstem James River had acceptable dissolved oxygen levels. In addition the entire tidal freshwater portion (fall line to just above the Chickahominy River) has good benthic community based on the results from the Chesapeake Bay Benthic Index of Biological Community; therefore the James River from the fall line to the oligohaline boundary was considered impaired solely for Nutrients/Eutrophication Biological Indicators (EPA Overlist).

During the 2006 cycle, the CB water quality standards were implemented. The Upper Tidal Freshwater James River from the fall line to the Appomattox fails the Shallow Water Use SAV criteria.

IMPAIRMENT SOURCE: Nonpoint Source, Point Source

The tributary strategy for the James River assigned sources and allocations.

RECOMMENDATION: Problem Characterization

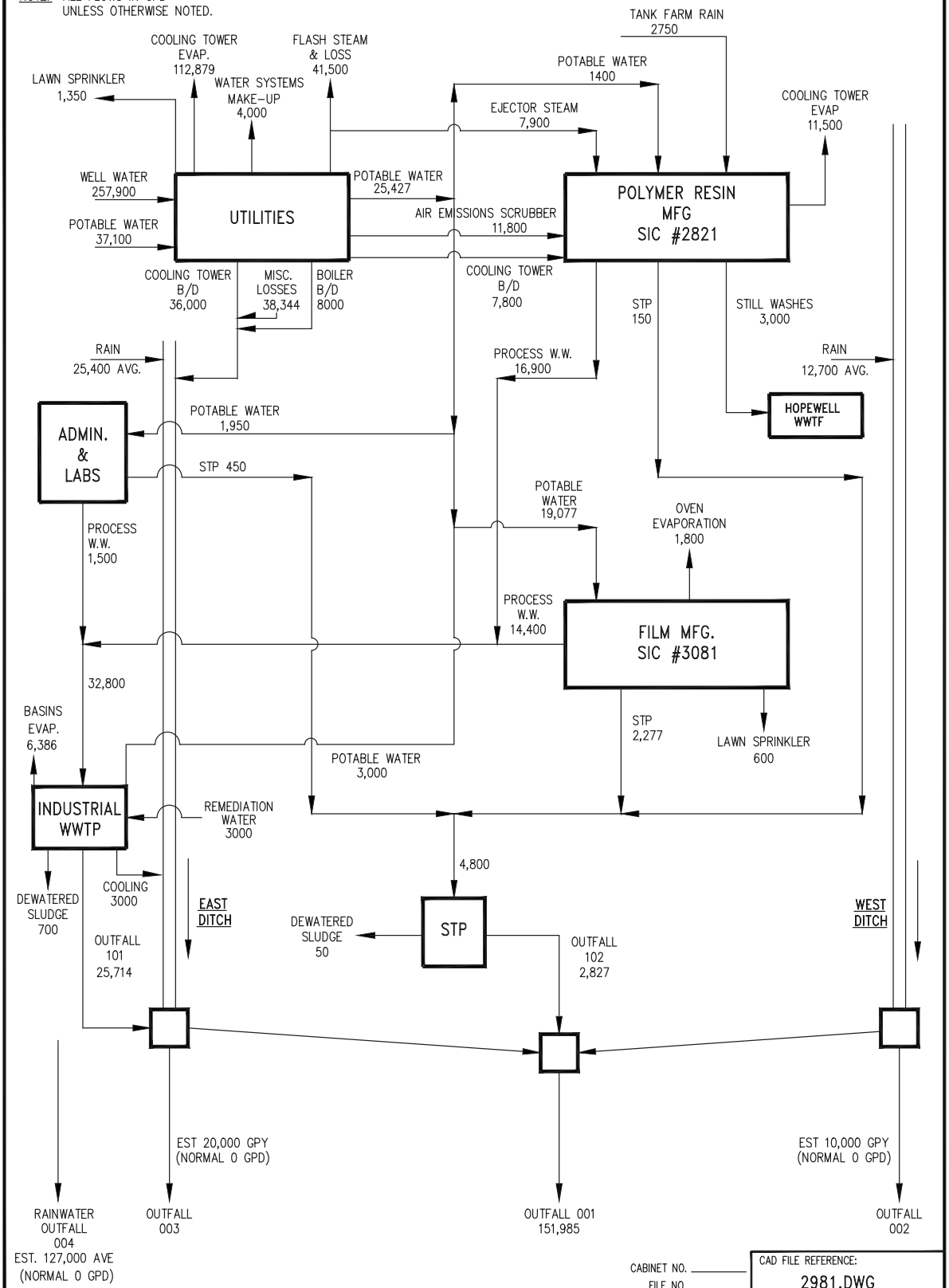
ATTACHMENT B

Facility Diagrams and Summary of Operations

Storm Water Drainage Maps were submitted in plan size and cannot be incorporated electronically. Please see the hard copy file for plan size documents.

REFERENCE DRAWINGS:

NOTE: ALL FLOWS IN GPD
UNLESS OTHERWISE NOTED.



CABINET NO. _____
FILE NO. _____

CAD FILE REFERENCE:
2981.DWG

NO.	DATE	BY	CK.	REVISIONS
1	4-15-11	WK	SH	REVISED FLOWS FOR 9/01/09 – 8/31/10 PERIOD

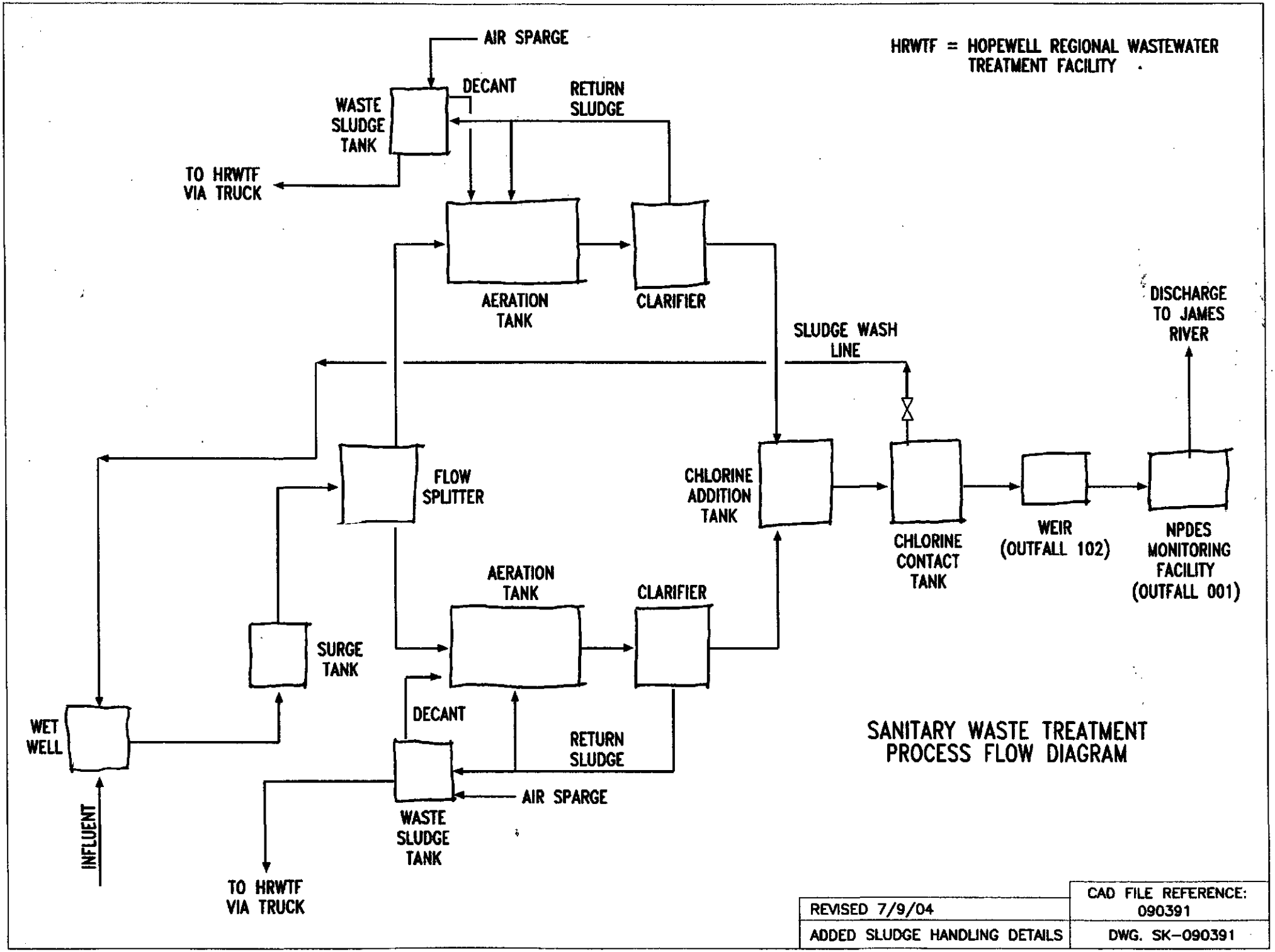
DWG. SCALE	NONE	PLOT SCALE	1:1
DATE	10/29/03	APPROVALS	
DRAWN BY:		DATE	BY
PLANT			
BLDG.NO.			
CHARGE			
PROJECT			

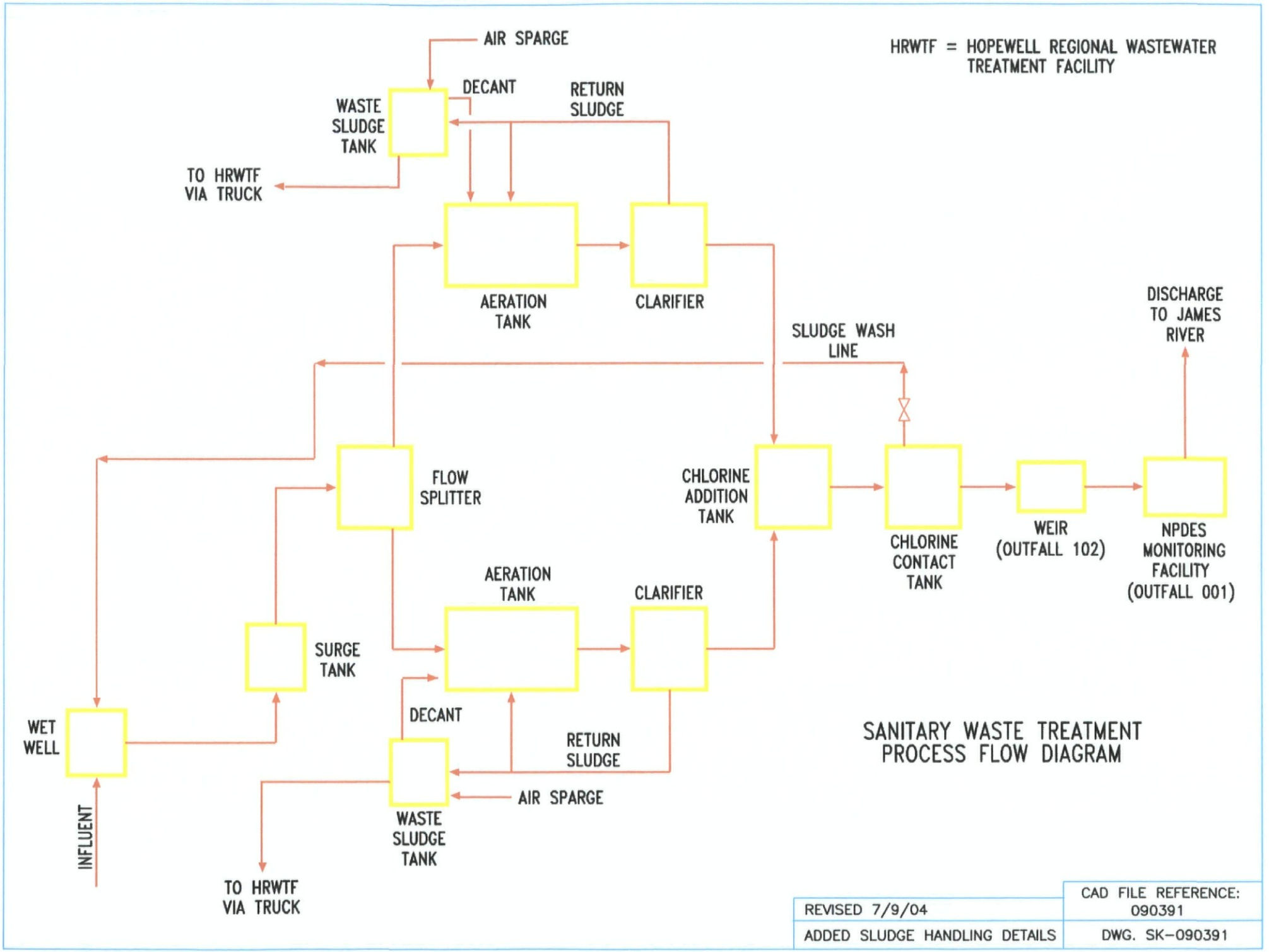
DU PONT
DU PONT POLYESTER FILMS
HOPEWELL SITE

SITE WATER BALANCE
SCHEMATIC

DWG.NO. 2981

REV.	CLASS
1	FD


HRWTF = HOPEWELL REGIONAL WASTEWATER TREATMENT FACILITY
AIR SPARGE
DECANT
RETURN SLUDGE
WASTE SLUDGE TANK
TO HRWTF VIA TRUCK
AERATION TANK
CLARIFIER
SLUDGE WASH LINE
DISCHARGE TO JAMES RIVER
FLOW SPLITTER
CHLORINE ADDITION TANK
CHLORINE CONTACT TANK
WEIR (OUTFALL 102)
NPDES MONITORING FACILITY (OUTFALL 001)
AERATION TANK
CLARIFIER
SURGE TANK
WET WELL
DECANT
RETURN SLUDGE
AIR SPARGE
WASTE SLUDGE TANK
INFLUENT
TO HRWTF VIA TRUCK
SANITARY WASTE TREATMENT PROCESS FLOW DIAGRAM
REVISED 7/9/04
ADDED SLUDGE HANDLING DETAILS
CAD FILE REFERENCE: 090391
DWG. SK-090391


HRWTF = HOPEWELL REGIONAL WASTEWATER TREATMENT FACILITY
AIR SPARGE
DECANT
RETURN SLUDGE
WASTE SLUDGE TANK
TO HRWTF VIA TRUCK
AERATION TANK
CLARIFIER
SLUDGE WASH LINE
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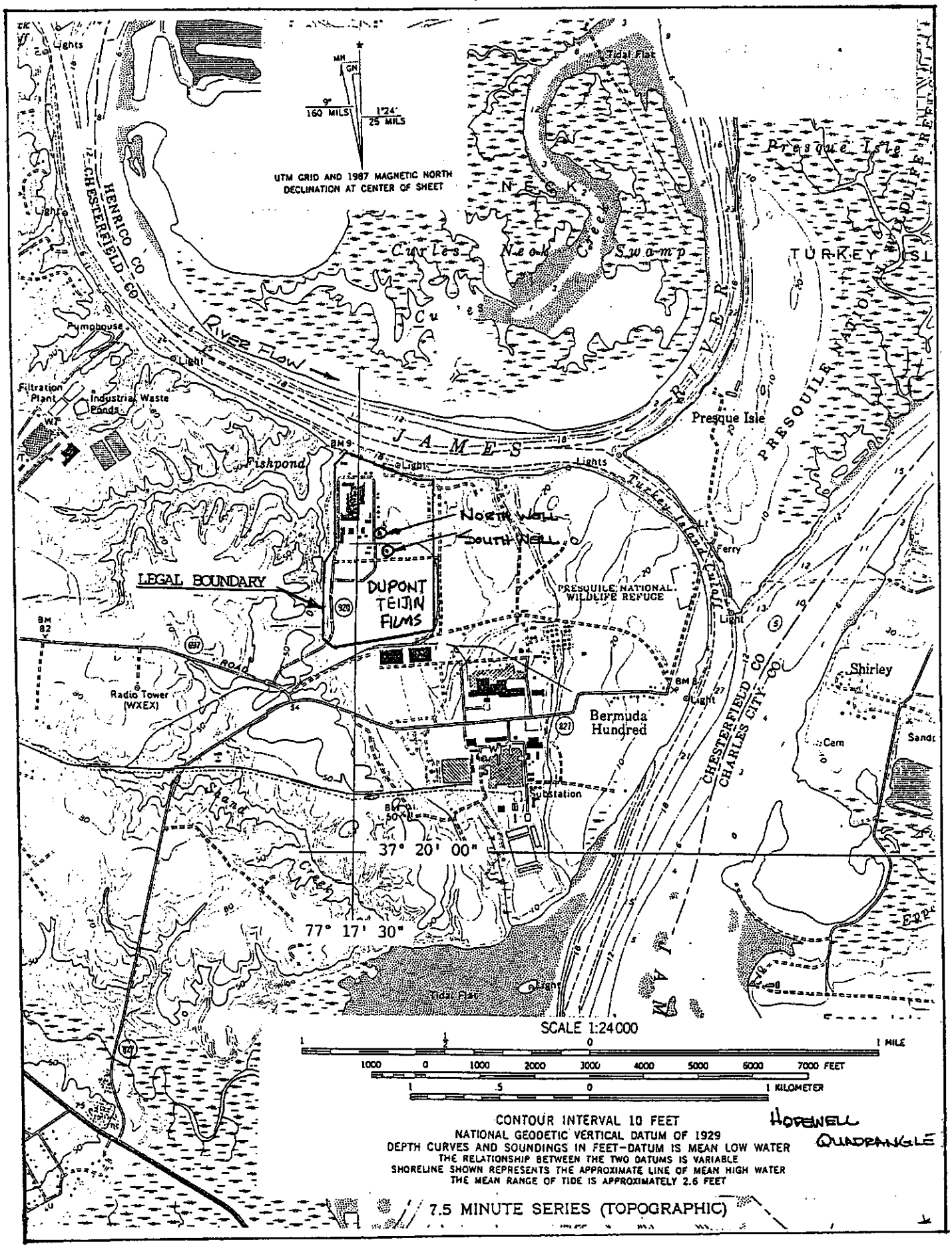
SANITARY WASTE TREATMENT PROCESS FLOW DIAGRAM
REVISED 7/9/04
ADDED SLUDGE HANDLING DETAILS
CAD FILE REFERENCE: 090391
DWG. SK-090391

ATTACHMENT C

Facility Location Map


UTM GRID AND 1987 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET
MN
GN
9°
160 MILS
124'
25 MILS
HENRICO CO
CHESTERFIELD CO
Lights
Tidal Flat
Presque Isle
NECK
Curles Neck Creek
Swamp
RIVER
TURKEY
ISL
PRESQUILE HARBOR
Pumphouse
River Flow
Filtration Plant
Industrial Waste Ponds
WF
JAMES
Fishpond
BM 9
Light
Lights
Presque Isle
Turkey Island Cutoff
NORTH WELL
SOUTH WELL
Ferry
LEGAL BOUNDARY
DUPONT TEIJIN FILMS
PRESQUILE NATIONAL WILDLIFE REFUGE
BM 82
ROAD
Radio Tower (WXEX)
Bermuda Hundred
Shirley
Cem
Sandy
CHESTERFIELD CO
CHARLES CITY CO
Substation
BM 50
Stand
Creek
37° 20' 00"
77° 17' 30"
Tidal Flat
Light
SCALE 1:24000
1 0 1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 .5 0 1 KILOMETER
CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929
DEPTH CURVES AND SOUNDINGS IN FEET—DATUM IS MEAN LOW WATER
THE RELATIONSHIP BETWEEN THE TWO DATUMS IS VARIABLE
SHORELINE SHOWN REPRESENTS THE APPROXIMATE LINE OF MEAN HIGH WATER
THE MEAN RANGE OF TIDE IS APPROXIMATELY 2.6 FEET
HOPEWELL QUADRANGLE
7.5 MINUTE SERIES (TOPOGRAPHIC)

ATTACHMENT D

Site Inspection

ATTACHMENT E

Effluent Data:

Application Data & DMR Data

Effluent Data from the Application

Outfall 001					
Pollutant	**Max Daily Value**	**Max 30-day value**	**Long term average value**	**Att-A**	**Units**
Flow	1074961	181262	148985		gpd
cBOD5	80	46.5	23.3		mg/L
COD	756	451.5	169		mg/L
TOC	31.5				mg/L
TSS	95	62.5	20.3		mg/L
Ammonia	1	0.5	0.3		mg/L
Bromide	0.7				mg/L
TRC	0.3	0.2	0.1	0.3	mg/L
Color	30				pcu
Fecal coliform	>1600				MPN/100mL
Fluoride	0.54				mg/L
Nitrate + Nitrite	8.9	6.8	4.8		mg/L
Nitrogen, Total Organic	44.6	26.4	10.8		mg/L
Phosphorus, Total	2.6	1.4	0.86		mg/L
Alpha, Total	1.9			1.9	pCi/L
Beta, Total	5.6			5.6	pCi/L
Radium, Total	1				pCi/L
Radium226, Total	0.7				pCi/L
Sulfate	26			26	mg/L
Sulfide	0.4				mg/L
Aluminum, Total	0.124				mg/L
Boron, Total	0.03				mg/L
Cobalt, Total	0.019				mg/L
Iron, Total	1.18				mg/L
Magnesium, Total	5.08				mg/L
Molybdenum, Total	0.845				mg/L
Manganese, Total	0.131				mg/L
Antimony, Total	0.102				mg/L
Arsenic, Total	0.006				mg/L
Chromium, Total	0.002				mg/L
Copper, Total	0.98				mg/L
Nickel, Total	0.006				mg/L
Zinc, Total	0.251				mg/L
Chloride	153				mg/L
Hardness	85			85	mg/L
Nitrate	8.6	6.5	4.3	3.04	mg/L
TDS	394			394	mg/L
Tributyltin	0.3			<0.3	ug/L
Antimony, dissolved				164	ug/L
Arsenic, dissolved				5.3	ug/L
Barium, dissolved				62	ug/L
Cadmium, dissolved				1	ug/L
Copper, dissolved				68.4	ug/L
Iron, dissolved				1040	ug/L

Lead, dissolved				1.2	ug/L
Manganese, dissolved				154	ug/L
Nickel, dissolved				8	ug/L
Selenium, dissolved				1.6	ug/L
Zinc, dissolved				1960	ug/L
E.coli				1046	MPN/100mL
Hydrogen Sulfide				12	ug/L

Human Health (HH) Standard
Aquatic Standard
Both HH and Aquatic Standards

Outfall 101				
Pollutant	Max Daily Value	Max 30-day value	Long term average value	Units
Flow	57830	30792	22714	gpd
BOD5	463	152	46.9	mg/L
COD	1734	699.3	386.7	mg/L
TOC	318			mg/L
TSS	74	50	23	mg/L
Phosphorus, Total	2.2	1	0.5	mg/L

Outfall 102				
Pollutant	Max Daily Value	Max 30-day value	Long term average value	Units
Flow	9651	4672	2827	gpd
BOD5	19	19	6.3	mg/L
COD	44	44	30.4	mg/L
TOC	12.6			mg/L
TSS	28.5	28.5	11.5	mg/L

Outfall 901					
Pollutant	**Grab Sample- 1st 30 min**	**Flow-weighted composite**	**Units**	**2x Acute Criterion**	**DEQ Benchmarks**
BOD5	12	31	mg/L		30
COD	76	178	mg/L		110
TSS	23	22	mg/L		100
Total Nitrogen	3.5	5.8	mg/L		2.2
Total Phosphorus	0.38	0.5	mg/L		2
pH	7.81	NA	s.u.		
Aluminum, Total	0.435	0.484	mg/L		750
Barium, Total	0.058	0.061	mg/L		
Boron, Total	0.023	0.023	mg/L		
Total Residual Chlorine	0.05	NA	mg/L	0.038	
Cobalt, Total	0.01	0.015	mg/L		
Color	30	30	PCU		
Dissolved Oxygen	4.33	NA	mg/L		
Fecal coliform	>1600	NA	MPN/100mL		
Fluoride	<0.1	0.12	mg/L		
Iron, Total	0.688	0.923	mg/L		1
Magnesium, Total	2.81	2.87	mg/L		
Manganese, Total	0.155	0.185	mg/L		
Molybdenum, Total	0.352	0.304	mg/L		
Nitrate	1.45	2.04	mg/L		
Nitrite	0.094	0.121	mg/L		
Total Kjeldahl Nitrogen (TKN)	1.94	3.61	mg/L		1.5
Gross alpha	3.5	<1.6	pCi/L		
Gross beta	7.2	5.4	pCi/L		
Radium 226	0.7	0.4	pCi/L		
Total Radium	0.9	0.2	pCi/L		
Sulfate	20	19	mg/L		
Titanium, Total	0.045	0.034	mg/L		
Antimony, Total	22	39	ug/L		
Cadmium, Total	0.7	0.6	ug/L	5	2.1
Chromium, Total	2	2	ug/L	820	16
Copper, Total	53	69	ug/L	18	18
Lead, Total	6	6	ug/L	140	120
Zinc, Total	699	451	ug/L	170	120

Parameters with an Acute Aquatic Standard
Parameters with only Human Health Standards
Parameters with an Acute Aquatic Standard and DEQ Benchmarks
Parameters with a DEQ Benchmark

Outfall 002					
Pollutant	**Grab Sample- 1st 30 min**	**Flow-weighted composite**	**Units**	**2x Acute Standard**	**DEQ Benchmarks**
BOD5	8	8	mg/L		30
COD	61	41	mg/L		110
TSS	13	13	mg/L		100
Total Nitrogen	3.6	3.2	mg/L		2.2
Total Phosphorus	0.15	0.11	mg/L		2
pH	6.18	NA	s.u.		
Aluminum, Total	1.42	0.451	mg/L		750
Barium, Total	0.093	0.057	mg/L		
Boron, Total	0.025	0.028	mg/L		
Total Residual Chlorine	0.02	NA	mg/L	0.038	
Color	50	40	PCU		
Dissolved Oxygen	5.54	NA	mg/L		
Fecal coliform	>1600	NA	MPN/100mL		
Iron, Total	1.93	0.72	mg/L		1
Magnesium, Total	0.847	0.64	mg/L		
Manganese, Total	0.058	0.05	mg/L		
Molybdenum, Total	0.022	0.064	mg/L		
Nitrate	0.58	0.65	mg/L		
Nitrite	0.052	0.045	mg/L		
Total Kjeldahl Nitrogen (TKN)	2.99	2.48	mg/L		1.5
Gross alpha	1	1.3	pCi/L		
Gross beta	4.6	4	pCi/L		
Radium 226	0.1	0.4	pCi/L		
Total Radium	0.2	0.4	pCi/L		
Sulfate	8	9	mg/L		
Titanium, Total	0.035	0.011	mg/L		
Antimony, Total	8	8	ug/L		
Cadmium, Total	1.2	0.8	ug/L	5	2.1
Chromium, Total	4	2	ug/L	820	16
Copper, Total	13	21	ug/L	18	18
Lead, Total	10	13	ug/L	140	120
Zinc, Total	1490	754	ug/L	170	120

Parameters with an Acute Aquatic Standard
Parameters with only Human Health Standards
Parameters with an Acute Aquatic Standard and DEQ
Parameters with a DEQ Benchmark

Outfall 003					
Pollutant	**Grab Sample-1st 30 min**	**Flow-weighted composite**	**Units**	**2x Acute Standard**	**DEQ Benchmarks**
BOD5	88	90	mg/L		30
COD	168	194	mg/L		110
TSS	33	14	mg/L		100
Total Nitrogen	3.2	3.5	mg/L		2.2
Total Phosphorus	0.61	0.68	mg/L		2
pH	9.26	NA	s.u.		
Aluminum, Total	0.527	0.369	mg/L		750
Barium, Total	0.058	0.107	mg/L		
Boron, Total	0.023	0.024	mg/L		
Total Residual Chlorine	0.01	NA	mg/L	0.038	
Color	30	30	PCU		
Dissolved Oxygen	3.77	NA	mg/L		
Fecal coliform	>1600	NA	MPN/100 mL		
Fluoride	0.14	0.16	mg/L		
Iron, Total	0.64	0.559	mg/L		1
Magnesium, Total	3.53	4.16	mg/L		
Manganese, Total	0.035	0.059	mg/L		
Molybdenum, Total	0.272	0.344	mg/L		
Nitrate	1.35	1.44	mg/L		
Nitrite	0.0147	0.18	mg/L		
Total Kjeldahl Nitrogen (TKN)	1.66	1.88	mg/L		1.5
Sulfate	24	28	mg/L		
Titanium, Total	0.033	0.025	mg/L		
Gross alpha	1.9	<2.4	pCi/L		
Gross beta	6.3	9.4	pCi/L		
Radium 226	0.6	0.4	pCi/L		
Total Radium	0.7	0.4	pCi/L		
Antimony, Total	18	24	mg/L		
Cadmium, Total	0.6	0.6	ug/L	5	2.1
Chromium, Total	2	4	ug/L	820	16
Copper, Total	23	28	ug/L	18	18
Zinc, Total	432	429	ug/L	170	120

Parameters with an Acute Aquatic Standard
Parameters with only Human Health Standards
Parameters with an Acute Aquatic Standard and DEQ Benchmarks
Parameters with a DEQ Benchmark

Outfall 004					
Pollutant	**Grab Sample-1st 30 min**	**Flow-weighted composite**	**Units**	**2x Acute Standard**	**DEQ Benchmarks**
BOD5	7	24	mg/L		30
COD	40	97	mg/L		110
TSS	29	22	mg/L		100
Total Nitrogen	2.5	3.8	mg/L		2.2
Total Phosphorus	0.27	0.16	mg/L		2
pH	7.23	NA	s.u.		
Aluminum, Total	1.45	0.664	mg/L		750
Barium, Total	0.039	0.039	mg/L		
Boron, Total	0.014	0.018	mg/L		
Total Residual Chlorine	0.02	NA	mg/L	0.038	
Color	30	30	PCU		
Dissolved Oxygen	3.96	NA	mg/L		
Fecal coliform	>1600	NA	MPN/100mL		
Iron, Total	1.6	0.688	mg/L		1
Magnesium, Total	0.869	1.17	mg/L		
Manganese, Total	0.062	0.053	mg/L		
Molybdenum, Total	0.035	0.069	mg/L		
Nitrate	0.7	1.14	mg/L		
Nitrite	0.014	0.044	mg/L		
Total Kjeldahl Nitrogen (TKN)	1.81	2.56	mg/L		1.5
Sulfate	8	10	mg/L		
Titanium, Total	0.125	0.049	mg/L		
Gross alpha	1.7	2	pCi/L		
Gross beta	5.8	4.5	pCi/L		
Radium 226	0.4	0.4	pCi/L		
Total Radium	0.5	0.6	pCi/L		
Antimony, Total	<5	10	ug/L		
Cadmium, Total	1.7	1.4	ug/L	5	2.1
Chromium, Total	2	2	ug/L	820	16
Copper, Total	49	46	ug/L	18	18
Lead, Total	15	10	ug/L	140	120
Zinc, Total	1190	1020	ug/L	170	120

Parameters with an Acute Aquatic Standard
Parameters with only Human Health Standards
Parameters with an Acute Aquatic Standard and DEQ
Parameters with a DEQ Benchmark

EFFLUENT DMR DATA

Outfall 001																				
	FLOW (MGD)		PH (SU)		TSS (mg/L)		CL2, TOTAL (mg/L)		PHOSPHORUS, TOTAL (AS P) (mg/L)		NITROGEN, TOTAL (AS N) (mg/L)		DO, NOV-MAY (mg/L)	DO, JUN-OCT (mg/L)	AMMONIA, AS N (mg/L)		CBOD5 (mg/L)		pH, TOTAL EXCURSION TIME (minutes)	pH, IND. EXCURSION TIME (minutes)
Due Date	Quant Avg	Quanti Max	Conc Min	Conc Max	Conc. Avg	Conc Max	Conc. Avg	Conc Max	Conc. Avg	Conc Max	Conc. Avg	Conc Max	Min	Min	Conc. Avg	Conc Max	Conc. Avg	Conc Max		
10-Dec-07	0.0806	0.1906	9	9	10.8	20	0.2	0.3	1.61	1.9	17.05	19.2	7.88		0.2	0.4	20	25	0	0
10-Jan-08	0.1164	0.638	6.2	9.3	18	26	0.18	0.2	1.3	1.76	13.8	24	7.83		0.5	0.9	24.3	45	17	10
10-Feb-08	0.1104	0.2675	6	9	20.6	47	0.15	0.2	1.46	2.64	16.04	26.12	7.68		1.5	4.6	>29.2	>99.0	0	0
10-Mar-08	0.1332	0.5623	6.5	9.2	13.3	25	0.14	0.2	2.08	3.15	16.7	25.14	7.51		3.5	7.5	17.8	24	5	5
10-Apr-08	0.1153	0.4754	6.2	8.8	11.8	16	0.16	0.2	1.91	2.07	14.1	19.13	6.77		0.7	0.8	25	32	0	0
10-May-08	0.1891	1.3819	5.2	8.9	11.5	14	0.16	0.3	<1.30	2.11	15.05	26.17	6.81		<4.09	8.8	30.3	36	140	50
10-Jun-08	0.1339	0.559	4.8	8.4	17.6	34	0.12	0.2	2.34	3.29	11.46	18.85	5.9		0.6	1.2	30.2	38	154	45
10-Jul-08	0.1662	0.4095	5.4	8.7	26.3	43	0.15	0.2	2.83	4.87	15.7	26		5.97	<0.65	2	29	34	116	55
10-Aug-08	0.1615	0.3555	5.2	9	26	53	0.14	0.2	1.35	2.84	12.74	27.76		5.86	1.2	4	20.8	30	107	57
10-Sep-08	0.1515	0.531	5.4	8.6	14.5	20	0.16	0.2	0.85	1.17	7.86	11.38		6.55	0.4	0.5	11.5	17	234	55
10-Oct-08	0.1624	0.6599	5.7	8.7	15	26	0.14	0.2	1.22	1.78	14.09	16.25		6.99	0.3	0.5	19	24	195	55
10-Nov-08	0.1108	0.1995	6.1	8.8	13.2	21	0.14	0.2	1.01	1.24	11.42	14.16		7.33	0.4	0.6	21.2	32	0	0
10-Dec-08	0.1286	0.5125	5.7	8.9	9.5	11	0.14	0.2	0.59	0.92	11.79	17.42	5.86		0.2	0.3	17.5	23	80	50
10-Jan-09	0.126	0.8519	5.3	8.9	38	80	0.14	0.2	0.63	0.94	11.68	16.36	6.1		<0.35	0.8	22.8	28	281	58
10-Feb-09	0.1147	0.4437	6	9.1	34	46	0.15	0.2	0.8	1.06	12.08	15.8	7.3		0.2	0.3	13	19	10	10
10-Mar-09	0.0936	0.3343	6	9	21.3	40	0.14	0.2	0.72	0.98	13.17	18.88	5		0.2	0.4	25.3	38	0	0
10-Apr-09	0.1534	0.572	6	9	20.8	29	0.16	0.2	0.85	1.06	13.05	16.5	5.2		0.8	2.2	19.8	28	0	0
10-May-09	0.1064	0.386	5.2	9	18	27	0.15	0.2	0.91	1.18	15.15	19.77	6.9		1.7	4.5	15.6	20	100	55
10-Jun-09	0.1305	0.6072	5.6	9	5.8	8	0.1	0.1	0.86	1.08	20.86	32.9	6.9		5.7	11.7	13	24	115	45
10-Jul-09	0.1346	0.2809	5.3	8.7	14.5	25	0.12	0.2	0.64	0.92	9.23	15.08		7.47	1.2	2	7	9	45	45
10-Aug-09	0.1223	0.3338	5.2	8.5	5.2	10	0.14	0.2	0.77	1.19	7.1	9.96		7.54	0.3	0.5	6.7	8.5	28	28
10-Sep-09	0.1669	0.3095	6.1	8.7	6.5	14	0.13	0.2	0.63	0.79	6.61	9.14		7.75	0.4	0.7	8.8	15.9	0	0
10-Oct-09	0.1353	0.26	6	8.8	4.3	7	0.1	0.1	0.84	0.96	8.85	10.6		6.87	0.3	0.6	<7.35	11	0	0
10-Nov-09	0.1161	0.3568	6	8.7	7	15	0.15	0.2	0.77	0.88	7.6	9.82		7.3	0.2	0.3	7.4	10	0	0
10-Dec-09	0.176	1.075	5.9	9	12	23	0.14	0.2	0.66	0.98	6.43	9.24	6.1		0.2	0.3	6.8	9	55	55
10-Jan-10	0.1699	0.6042	6	8.7	12.1	21	0.15	0.2	0.74	1.11	6.98	9.02	6.1		0.3	0.7	12.8	20	0	0
10-Feb-10	0.1131	0.4166	6	9	20.4	28.5	0.14	0.2	0.58	0.64	10.25	10.72	6.89		<0.17	0.2	46.5	80	0	0
10-Mar-10	0.1662	0.9716	6	8.7	19.9	23	0.13	0.2	0.66	1	10.3	13.01	8.32		<0.22	0.5	44.8	59	0	0
10-Apr-10	0.1515	0.9044	6.1	9	21.6	32	0.14	0.2	0.55	0.75	13.24	13.82	6.2		0.2	0.2	28.5	42	0	0
10-May-10	0.1144	0.2888	6	8.9	19.1	31	0.15	0.3	1.14	2.6	10.71	12.32	6.3		0.4	0.7	18.4	28	0	0
10-Jun-10	0.1452	0.5004	6.2	9	62.5	95	0.16	0.3	1.39	2.25	26.44	44.59	4.9		0.5	1	32	58	0	0
10-Jul-10	0.1417	0.2304	6.1	8.7	30.3	54	0.14	0.2	1.05	1.23	11.9	14.49		6.13	<0.13	0.2	32.5	46	0	0
10-Aug-10	0.1779	0.4468	6	8.6	17.4	25	0.1	0.1	1.15	1.27	11.15	13.42		5.3	<0.23	0.3	22.2	49	0	0
10-Sep-10	0.1811	0.4168	4.9	8.7	22.5	33	0.16	0.2	0.74	1.27	7.55	9.81		5.8	<0.17	0.4	29.3	48	7	7
10-Oct-10	0.18	1.083	4.7	8.4	26.9	37	0.12	0.1	1	1.3	8.5	12.2		6.2	0.4	0.7	27.2	79	421	60
Max	0.1891	1.3819	9	9.3	62.5	95	0.2	0.3	2.83	4.87	26.44	44.59	8.32	7.75	5.7	11.7	46.5	80	421	60
Average	0.139334	0.526191	5.828571	8.84	18.52	30.27143	0.142571	0.2	1.077353	1.576571	12.18943	17.40086	6.592857	6.647143	0.833333	1.751429	21.42424	32.04118	60.28571429	21.28571429
90%tile	0.17714	0.94472	6.2	9	28.94	50.6	0.16	0.26	1.82	2.76	16.436	26.15	7.83	7.519	1.58	4.56	31.66	55.3	178.6	55
10%tile	0.11056	0.263	5.2	8.6	6.7	12.2	0.12	0.14	0.63	0.896	7.28	9.814	5.2	5.818	0.2	0.3	7.68	10.3	0	0

Outfall 101						
DMR Due Date	FLOW (MGD)		BOD5 (mg/L)		TSS (mg/L)	
	Monthly Average	Daily Max	Monthly Avg Conc	Daily Max Conc	Monthly Avg Conc	Daily Max Conc
10-Dec-07	0.0275	0.0456	10.4	13	7.2	10
10-Jan-08	0.02	0.0271	15.75	30	13.8	31
10-Feb-08	0.0145	0.0305	>47.20	>104.00	25.2	41
10-Mar-08	0.015	0.0187	<6.50	13	10.8	22
10-Apr-08	0.0199	0.0285	<9.00	13	7.8	10
10-May-08	0.0328	0.0493	7.25	8	10.3	15
10-Jun-08	0.0296	0.0462	11	13	18.6	28
10-Jul-08	0.0333	0.0445	23.25	32	26.5	43
10-Aug-08	0.0272	0.036	13.8	19	19.6	60
10-Sep-08	0.024	0.0292	46	133	8.3	14
10-Oct-08	0.0304	0.0517	27.75	52	20.8	26
10-Nov-08	0.0293	0.0366	9.4	15	9.6	11
10-Dec-08	0.0292	0.0394	22.25	50	13.3	21
10-Jan-09	0.0217	0.0555	12.8	22	28.6	35
10-Feb-09	0.0231	0.03	8	10	43.5	87
10-Mar-09	0.0149	0.0223	7.5	10	19	28
10-Apr-09	0.0218	0.0287	12.5	17	21.8	26
10-May-09	0.0184	0.0284	13.4	19	11	15
10-Jun-09	0.0164	0.0266	8.5	19	8.3	25
10-Jul-09	0.016	0.0287	9.75	18	6.3	7
10-Aug-09	0.0179	0.026	10.65	22	2.2	3
10-Sep-09	0.0204	0.0256	13.25	19	2.5	3
10-Oct-09	0.0224	0.0325	9.5	16.5	3	4
10-Nov-09	0.0218	0.0277	2.8	4	5.8	10
10-Dec-09	0.0252	0.031	2.25	3	5	7
10-Jan-10	0.0308	0.0381	3.4	5	8.1	13.5
10-Feb-10	0.0267	0.0441	50.2	133	30.6	39
10-Mar-10	0.0243	0.0578	15.5	38	21.8	36
10-Apr-10	0.0217	0.0435	26	42	24.8	35
10-May-10	0.0191	0.0313	24.8	38	21.1	31
10-Jun-10	0.024	0.0325	62.5	91	48.4	61
10-Jul-10	0.0176	0.0305	104.25	232	50	74
10-Aug-10	0.0196	0.0566	55.6	107	31.5	66
10-Sep-10	0.0213	0.0332	152	463	28.1	49
10-Oct-10	0.0231	0.0344	39.4	99	38.7	60
Max	0.0333	0.0578	152	463	50	87
Average	0.022883	0.035666	25.98125	53.48529	18.62571	29.9
90%tile	0.03008	0.05074	55.06	125.2	35.82	60.6
10%tile	0.01616	0.02624	7.275	8.6	5.32	7

Outfall 101, Continued...

Parameter (ug/L)	10-Apr-08	10-Apr-09	10-Apr-10
TRICHLOROETHYLENE	<100.0	<5.0	<1.0
BIS(2-ETHYLHEXYL)	500	<5.0	<5.0
ETHYLBENZENE	<100.0	<5.0	<1.0
VINYL CHLORIDE	<100.0	<5.0	<1.0
PHENOL (AS C6H5OH)	<50.0	<5.0	<10.0
ACRYLONITRILE (AS	<500.0	<25.0	<5.0
METHYLENE CHLORIDE	<100.0	<5.0	<1.0
DI-N-BUTYL PHTHALATE	<50.0	<5.0	<5.0
4,6-DINITRO-O-CREOSOL	<50.0	<20.0	<50.0
2-NITROPHENOL	<50.0	<5.0	<10.0
BENZENE (AS C6H6)	<100.0	<5.0	<1.0
1,1,1-TRICHLOROETHANE	<100.0	<5.0	<1.0
TETRACHLOROETHYLENE	<100.0	<5.0	<1.0
TOLUENE (AS C7H8)	<100.0	<5.0	<1.0
CHLOROFORM (AS CHCL3)	<100.0	<5.0	<1.0
CARBON TETRACHLORIDE	<100.0	<5.0	<1.0
2,4-DINITROTOLUENE	<50.0	<5.0	<5.0
2,6-DINITROTOLUENE	<50.0	<5.0	<5.0
1,1-DICHLOROETHYLENE	<100.0	<5.0	<1.0
1,2-DICHLOROBENZENE	<100.0	<5.0	<1.0
1,2-DICHLOROETHANE	<100.0	<5.0	<1.0
1,2-DICHLOROPROPANE	<100.0	<5.0	<1.0
TRANS-1,2-	<100.0	<5.0	<1.0
1,2,4-TRICHLOROBENZENE	<50.0	<5.0	<5.0
1,3-DICHLOROBENZENE	<100.0	<5.0	<1.0
1,3-DICHLOROPROPYLENE	<100.0	<5.0	<1.0
1,4-DICHLOROBENZENE	<100.0	<5.0	<1.0
2-CHLOROPHENOL	<50.0	<5.0	<10.0
2,4-DICHLOROPHENOL	<50.0	<5.0	<10.0
2,4-DIMETHYLPHENOL	<50.0	<5.0	<10.0
2,4-DINITROPHENOL	<50.0	<20.0	<50
3,4-BENZOFLUORANTHENE	<50.0	<5.0	<5.0
4-NITROPHENOL	<50.0	<20.0	<50
ACENAPHTHENE	<50.0	<5.0	<5.0
ACENAPHTHYLENE	<50.0	<5.0	<5.0
ANTHRACENE (AS C6H4(CH)2C6H4)	<50.0	<5.0	<5.0
BENZO(A)ANTHRACENE	<50.0	<5.0	<5.0
BENZO(A)PYRENE	<50.0	<5.0	<5.0
BENZO(K)FLUORANTHENE	<50.0	<5.0	<5.0

CHLOROBENZENE, TOTAL (AS C6H5CL)	<100.0	<5.0	<1.0
CHLOROETHANE	<100.0	<5.0	<1.0
CHRYSENE, TOTAL	<50.0	<5.0	<5.0
DIETHYL PHTHALATE	<50.0	<5.0	<5.0
DIMETHYL PHTALATE	<50.0	<5.0	<5.0
FLUORANTHENE	<50.0	<5.0	<5.0
FLUORENE (AS F)	<50.0	<5.0	<5.0
HEXACHLOROBENZENE	<50.0	<5.0	<5.0
HEXACHLOROBUTADIENE,	<50.0	<5.0	<5.0
HEXACHLOROETHANE	<50.0	<5.0	<5.0
METHYL CHLORIDE	<100.0	<5.0	<1.0
NAPHTHALENE (AS C10H8)	<50.0	<5.0	<5.0
NITROBENZENE	<50.0	<5.0	<5.0
PHENANTHRENE	<50.0	<5.0	<5.0
PYRENE (AS C16H10)	<50.0	<5.0	<5.0
1,1,2-TRICHLOROETHANE	<100.0	<5.0	<1.0
1,1-DICHLOROETHANE	<100.0	<5.0	<0.00005

Outfall 102

DMR Due Date	FLOW (MGD)		BOD5 (mg/L)		CL2, TOTAL CONTACT (mg/L)
	Monthly Average	Daily Max	Monthly Avg Conc	Daily Max Conc	Min
10-Dec-07	0.0021	0.0034	3	3	1.6
10-Jan-08	0.0017	0.0041	<3.00	3	1.7
10-Feb-08	0.0045	0.014	>24.2	>129.0	1.8
10-Mar-08	0.0022	0.0048	<3.00	3	1.6
10-Apr-08	0.0023	0.0049	<2.00	<2.00	1.8
10-May-08	0.0032	0.0069	10	10	1
10-Jun-08	0.0035	0.0063	<3.00	<3.0	1
10-Jul-08	0.0033	0.0071	7	7	1.2
10-Aug-08	0.0036	0.0073	3	3	1.4
10-Sep-08	0.004	0.007	2	<2.0	1.6
10-Oct-08	0.0038	0.0075	<3.00	3	1.2
10-Nov-08	0.003	0.0067	5	5	1.7
10-Dec-08	0.0028	0.0044	<3.00	3	1.5
10-Jan-09	0.0031	0.0078	<3.00	3	1.2
10-Feb-09	0.0022	0.0057	19	19	1
10-Mar-09	0.0026	0.0042	9	9	1.4
10-Apr-09	0.0026	0.0051	8	8	1.7
10-May-09	0.0032	0.0055	7	7	1.2
10-Jun-09	0.0031	0.0054	9	9	1.6
10-Jul-09	0.0036	0.0073	4	4	1.5
10-Aug-09	0.0026	0.0052	9.7	9.7	1.7
10-Sep-09	0.0035	0.0047	4.8	4.8	1.1
10-Oct-09	0.0032	0.0056	<3.00	3	1.2
10-Nov-09	0.0024	0.0042	3	3	0.6
10-Dec-09	0.0024	0.0095	<2.00	<2.0	1.3
10-Jan-10	0.002	0.0097	19	19	1.6
10-Feb-10	0.002	0.0041	4	4	0.8
10-Mar-10	0.0018	0.004	4	4	1.5
10-Apr-10	0.0026	0.0051	4	4	1.1
10-May-10	0.0029	0.0044	7	7	1.5
10-Jun-10	0.0038	0.006	12	12	1.5
10-Jul-10	0.0047	0.0063	7	7	1.3
10-Aug-10	0.0031	0.007	3	3	1.6
10-Sep-10	0.0031	0.0041	8	8	1
10-Oct-10	0.0029	0.0049	12	12	1.5
Max	0.0047	0.014	19	19	1.8
Average	0.002954	0.006006	7.34	6.65	1.371428571
90%tile	0.0038	0.00768	12	12	1.7
10%tile	0.00204	0.0041	3	3	1

901						
DMR Due Date	FLOW		COPPER,		ZINC, DISSOLVED	
	Quant Avg	Quant Max	Conc Avg	Conc Max	Conc Avg	Conc Max
10-Jan-08	0.1273	0.1273	20	20	360	360
10-Apr-08	0.1894	0.1894	86	86	160	160
10-Jul-08	0.0269	0.0269	90	90	590	590
10-Oct-08	0.0568	0.0568	170	170	370	370
10-Jan-09	0.1366	0.1366	40	40	10	10
10-Apr-09	0.0468	0.0468	60	60	140	140
10-Jul-09	0.1942	0.1942	40	40	350	350
10-Oct-09	0.087	0.087	38	38	180	180
10-Jan-10	0.2035	0.2035	51	51	230	230
10-Apr-10	0.0488	0.0488	0.039	0.039	0.269	0.269
10-Jul-10	0.275	0.275	30	30	178	178
10-Oct-10	0.041	0.041	37	37	303	303
Max	0.275	0.275	170	170	590	590
Average	0.119442	0.119442	55.16992	55.16992	239.2724	239.2724

Outfall 004								
DMR Due Date	FLOW (MGD)		CADMIUM, DISSOLVED (UG/L AS CD)		COPPER, DISSOLVED (UG/L AS CU)		ZINC, DISSOLVED (AS ZN) (UG/L)	
	Quant Avg	Quant Max	Conc Avg	Conc Max	Conc Avg	Conc Max	Conc Avg	Conc Max
10-Dec-07	0.0454	0.0454	4	4	100	100	140	140
10-Jan-08	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL
10-Apr-08	0.0126	0.0126	<0.5	<0.5	4	4	40	40
10-Jul-08	0.0008	0.0008	4	4	30	30	1190	1190
10-Oct-08	0.0096	0.0096	<20	<20	40	40	640	640
10-Jan-09	0.1288	0.1288	<20	<20	60	60	1400	1400
10-Apr-09	1.011	0.011	<20	<20	<20	<20	100	100
10-Jul-09	1.47	1.47	2.8	2.8	32	32	1900	1900
10-Oct-09	0.002	0.002	1	1	25	25	540	540
10-Jan-10	0.0485	0.0485	2	2	41	41	91	91
10-Apr-10	0.0358	0.0358	0.003	0.003	0.018	0.018	0.647	0.647
10-Jul-10	0.0021	0.0021	<0.5	<0.5	17	17	230	230
10-Oct-10	0.0105	0.0105	6	6	50	50	1590	1590
Max	1.47	1.47	6	6	60	60	1900	1900
Average	0.231425	0.148092	2.829	2.829	36.27436	36.274364	655.1373	655.13725

ATTACHMENT F

Effluent Limitation Analysis

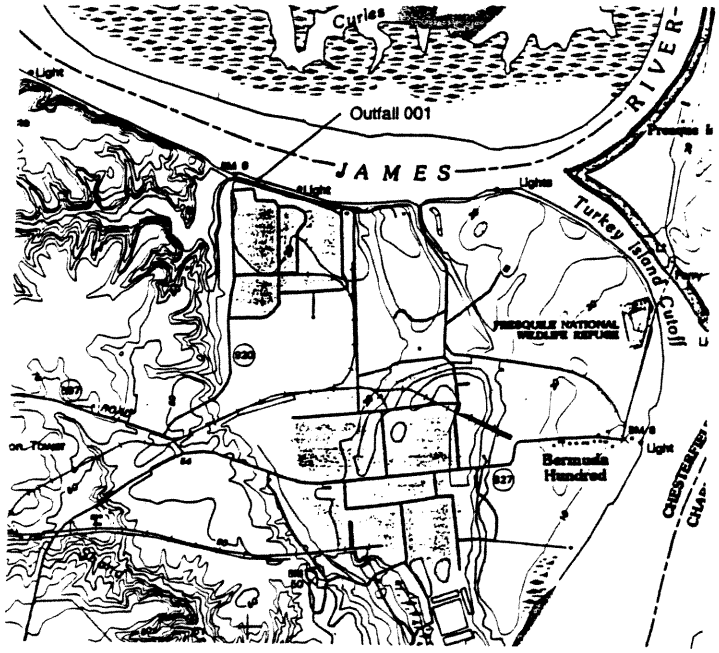
Lung Mixing Study (1998), Richmond Crater 208 Plan, Performance Based Limitation Development Memo, 40 CFR Part 401, MSTRANTI (version 2a) for Outfall 001 and Associated Data Source Report, STATS.EXE (version 2.0.4) analyses for Outfall 001, Proposed GW Data Evaluation and Associated STATS.EXE (version 2.0.4) analyses for the GW, MSTRANTI (version 2) for SW Screening Calculation and Associated Data Source Report.

Final Report

Mixing Zone Modeling of DuPont Polyester Films Plant Discharge

Submitted to

DuPont Polyester Films
Hopewell Site
P.O. Box 411
Richmond, VA 23860



by

Wu-Seng Lung, PhD, PE

December 1998

Mixing Zone Modeling of DuPont Polyester Films Plant Discharge

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MIXING ZONE MODELING OF DUPONT POLYESTER FILMS PLANT DISCHARGE

by Wu-Seng Lung

1. Introduction

This report documents the results from a modeling study performed for the DuPont Polyester Films Plant to support its VPDES permit renewal. The DuPont Polyester Plant is located in Hopewell, VA on the James Estuary. The Plant's wastewater effluent from outfall 001 enters directly into the James Estuary (Figure 1).

When the wastewater from a point source is discharged into the receiving water, its transport may be divided into two stages with distinctive mixing characteristics. Mixing and dilution in the first stage are determined by the initial momentum of the discharge. This initial contact with the receiving water is where the concentration of the effluent will be its greatest in the water column. Normally, the design of the discharge outfall should provide ample momentum to dilute the concentrations in the immediate contact area as quickly as possible. The second stage of mixing covers a more extensive area in which the effect of initial momentum is diminished and the waste is mixed primarily by ambient turbulence.

In the DuPont Polyester Films Plant case, the effluent is entering the receiving water from a 18-in pipe. A close study of the discharge outfall (Figure 2) and its vicinity has revealed that there is insignificant momentum associated with the effluent. First, the wastewater flow rate is very low, ranging from 0.1 MGD to 0.34 MGD, generating very small velocities (< 0.1 m/sec) at the outfall. Second, under the 1-day 10-year and 7-day 10-year low flows in the James River, the receiving water elevation is low, well below the invert of the discharge pipe. Third, upon its immediate exit, the wastewater travels for about 10 ft of rocks before reaching the James River proper, further diminishing the momentum, if any, associated with the effluent (Figure 2). Therefore, many mixing zone models developed for point source discharges such as CORMIX I, II, and III are not applicable due to the small velocity in the stream when entering the James River.

Recognizing this unique feature at the DuPont Polyester Films Plant, a technical approach and a modeling framework is developed to quantify the mixing zone of the effluent. Data from the effluent and the receiving water are used to support this modeling analysis. This report documents the data analysis and model development effort. Every attempt has been made to present the interpretation of the results in a clear manner to support the permit renewal process.

2. Mixing Zone Regulations

2.1 Federal Guidelines

For toxic discharges, U.S. EPA recommends careful evaluation of mixing to prevent zones of chronic toxicity that extend for excessive distances because of poor mixing. U.S. EPA

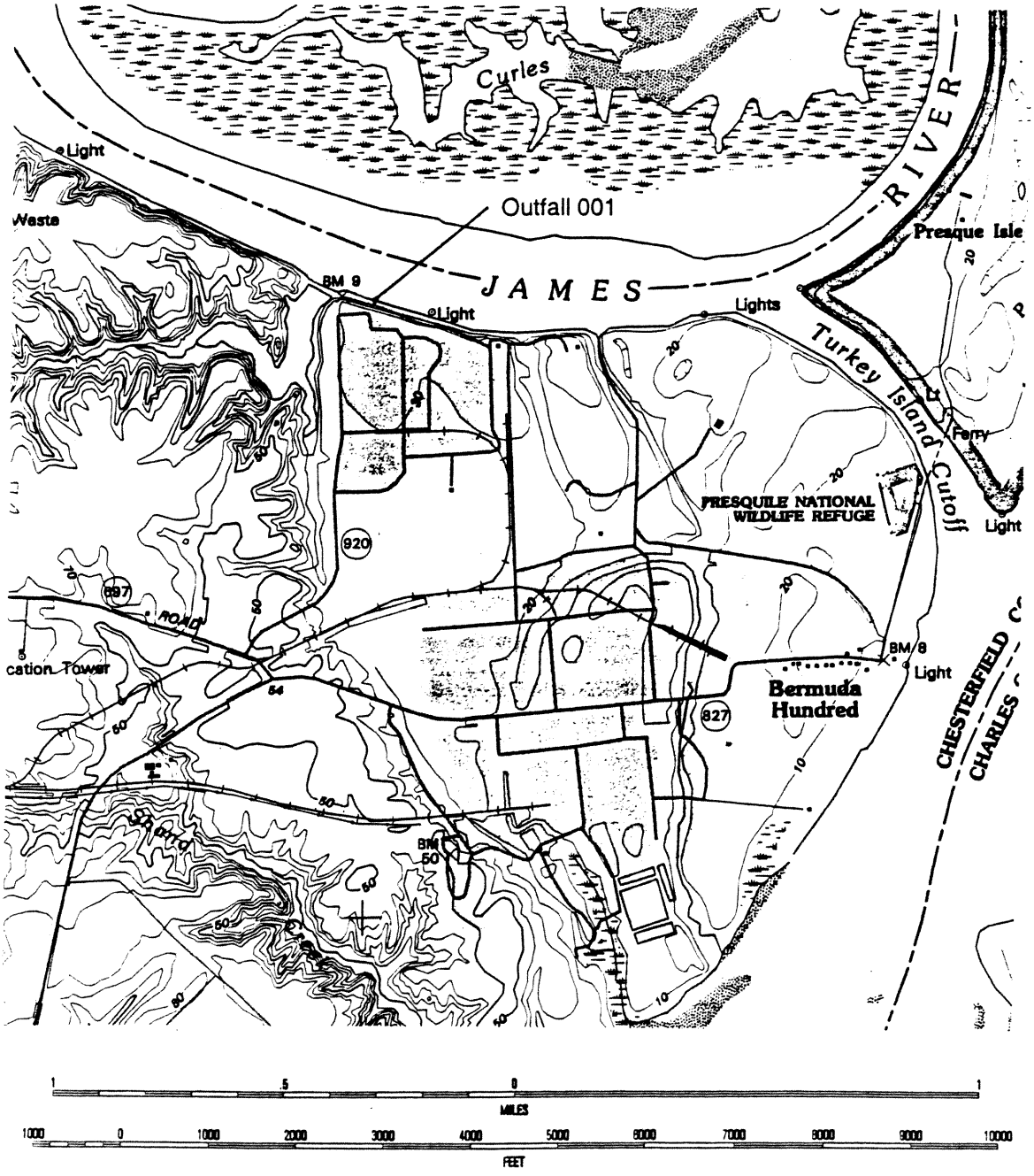

Figure 1. DuPont Polyester Films Plant and James River in Hopewell, Virginia

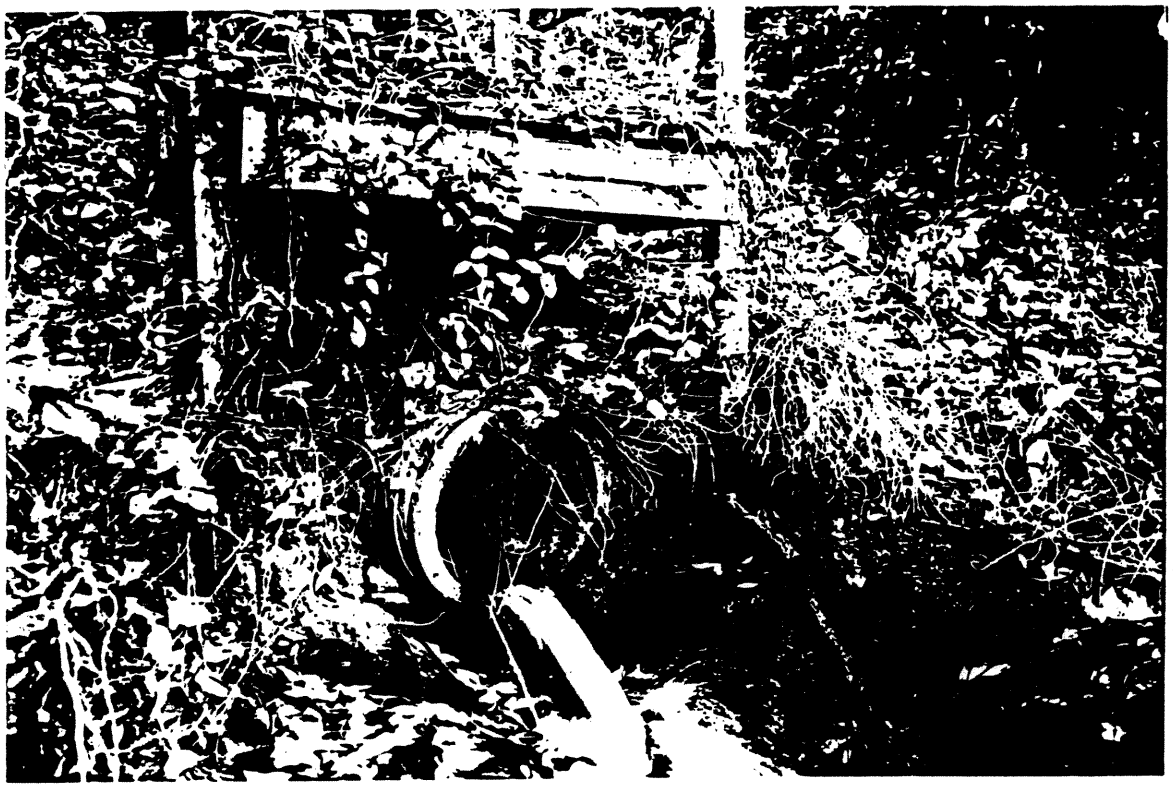

Figure 2. Outfall 001 of the DuPont Polyester Films Plant

maintains two water quality criteria for the allowable magnitude of toxic substances: a criterion maximum concentration (CMC) to protect against acute or lethal effects; and a criterion continuous concentration (CCC) to protect against chronic effects.

In rivers or tidal rivers such as the study area in the James River that has a persistent throughflow in the downstream direction and do not exhibit significant natural density stratification, hydrologically based flows 1Q10 and 7Q10 for the CMC and CCC, respectively, have been used traditionally in steady-state mixing zone modeling analysis and will be used in this study.

Lethality to passing organisms can be prevented in the mixing zone in one of four ways (U.S. EPA, 1991). The first method is to prohibit concentrations in excess of the CMC in the pipe itself, as measured directly at the end of the pipe. The second method is to use high-velocity discharge with an initial velocity of 3 m/s, or more, together with a mixing zone spatial limitation of 50 times the discharge length scale in any direction. The third alternative is not use a high-velocity discharge. Rather the discharger should provide data to the State regulatory agency showing that the most restrictive of the following conditions are met:

- The CMC should be met within 10% of the distance from the edge of the outfall structure to the edge of the regulatory mixing zone in any spatial direction.
- The CMC should be met within a distance of 50 times the discharge length scale in any spatial direction.
- The CMC should be met within a distance of five times the local water depth in any horizontal direction from any discharge outlet.

A fourth alternative is for the discharger to provide data to the State regulatory agency showing that a drifting organism would not be exposed to 1-hour average concentrations exceeding the CMC, or would not receive harmful exposure when evaluated by other valid toxicological analysis.

2.2 *Virginia Mixing Zone Regulations*

In the amendments to the Water Quality Standards proposed by the SWCB in 1991, Section VR680-21-01.2.C allows mixing zones. However, no mixing zone established by the SWCB shall:

- Interfere with passing or drifting aquatic organisms;
- Cause acute lethality to passing or drifting aquatic organisms;
- Be used for, or considered as, a substitute for minimum treatment technology required by the Clean Water Act and other applicable State and Federal laws.
- Constitute more than one-half of the width of the receiving watercourse nor constitute more than one-third of the area of any cross section of the receiving watercourse.
- Extend downstream at any time a distance more than five times the width of the receiving watercourse at the point of discharge.

Further, an allocated impact zone may be allowed within a regulatory mixing zone. This zone is the area of initial dilution of the effluent with the receiving water where the concentration

of the effluent will be its greatest in the water column. Mixing within these allocated impact zones shall be as quick as practical and shall be sized to prevent lethality to passing aquatic organisms. Mixing zones shall be determined (i.e., allowed) such that acute standards are met outside the allocated impact zone and chronic standards are met at the edge of the regulatory mixing zone.

3. Technical Approach

3.1 Conservative Assumptions

Data from the study area have suggested that the first two methods of preventing lethality are not applicable to the DuPont Polyester Films Plant discharge. As indicated above, the velocity entering the James River is relatively small (much less than 3 m/s). The study effort is therefore focused on alternative 3, providing data and information to the State, expecting that CMC can be met within the mixing zone as required.

A conservative approach of modeling analysis has been adopted for this study. That is, initial dilution modeling would be bypassed, thereby neglecting discharge-induced mixing. No credit would be given for the momentum-induced mixing; mixing between the effluent and the river water is achieved only by turbulent mixing in the ambient water (i.e., James River). Further, the effluent being modeled is assumed to be a conservative substance, given the fine spatial and temporal scales associated with the mixing zone.

3.2 Two-Dimensional Mass Transport Model

Fischer et al. (1979) presented the following two-dimensional mass transport model for ambient mixing in rivers:

$$C(x,y) = \frac{M}{du(4\pi D_y x/u)^{1/2}} \exp\left(\frac{-y^2 u}{4D_y x}\right) \qquad (1)$$

where

C = concentration at any given location
M = mass discharged / unit time
u = average velocity in the river
D_y = dispersion coefficient across the river
x = distance downstream from the diffusers
y = distance in lateral direction
d = average depth in the river

The James River near the DuPont Polyester Films Plant is under tidal influence, characterized by longitudinal dispersion (spread) of the effluent. Thus, Eq. 2 must be modified to incorporate the longitudinal spread along the James River.

Lung (1995) developed a simplified, analytical solution to track the fate and transport of pollutants in estuaries in a two-dimensional configuration. He applied that model to the Falling Creek wastewater treatment plant discharging directly into the James River.

For the study area where the river is sufficiently wide (about 1,000 ft as in this case), the solution may be approximated by the following expression for a conservative substance (Lung, 1995):

$$C = \frac{M}{\pi d (D_x D_y)^{1/2}} \exp(\frac{u x}{2 D_x}) K_0 [\frac{u}{2 D_x^{1/2}} (\frac{x^2}{D_x} + \frac{y^2}{D_y})^{1/2}] \quad (2)$$

where

D_x is the longitudinal dispersion coefficient and
K_0 is the modified Bessel function of the second kind of order zero.

Equation 2 represents a modification of Eq. 1 by incorporating the longitudinal dispersion in a tidal river and is used in this study to quantify the far-field mixing.

3.3 Toxicity Modeling

To apply the steady-state calculations (Eq. 2) to effluent toxicity modeling, the percent effluent measurements should be converted to toxic units (TUs). It is therefore, necessary to convert toxicity to units that can be directly related to mass. When comparing toxicity among chemicals, the relationship between toxicity and concentration is inverse; chemicals that have toxic effects at low concentrations have a greater "toxicity" than chemicals that have toxic effects at higher concentrations. The modeling of toxic effluents is based on mass balance principles (as Eq. 2 is derived); therefore, toxicity needs to be in units that increase when the percent of the effluent of the receiving stream increases. Thus, a TU is the reciprocal of the dilution that produces the test endpoint, i.e., acute toxicity endpoint (ATE) or chronic toxicity endpoint (CTE). An acute toxic unit (TU_a) is the reciprocal of an ATE. A chronic toxic unit (TU_c) is the reciprocal of a CTE. The acute toxicity unit is defined as:

$$TU_a = \frac{100}{LC_{50}} \quad (3)$$

where LC_{50} is the percent effluent that causes 50 percent of the organisms to die by the end of the acute exposure period. For example, an effluent that is found to have an LC_{50} of 5% is an effluent containing 20 TU_as. A similar definition can be expressed for chronic toxicity, TU_c.

The wasteload allocations must ensure that the CMC and the CCC are met in the receiving water at the desired duration and frequency. The CMC for toxicity is recommended as 0.3 TU_a (EPA, 1991). This is a value that should prevent lethality unless the duration of exposure exceeds 1 hour. Similarly, the chronic toxicity unit is defined as:

$$TU_c = \frac{100}{NOEC} \quad (4)$$

where *NOEC* is the highest tested concentration of the effluent at which no adverse effects are observed and is expressed in terms of percent effluent. The CCC for toxicity measured with chronic tests is recommended as the following: CCC = 1.0 TU_c (EPA, 1991).

4. Data Analysis

4.1 1Q10 and 7Q10 Low Flows

According to the fact sheet for the VPDES permit of the DuPont Polyester Films Plant, the 1Q10 low flow and 7Q10 low flow for the study area are 648 cfs and 720 cfs, respectively. The cross-sectional area of the James River at the Plant is 13,345 ft^2 which is considered a tidally averaged value for both low flows. Over a tidal cycle, the cross-sectional area remains relatively constant under these low flow conditions

4.2 Dimensions of the Regulatory Mixing Zone and Allocated Impact Zone

The dimensions of the allocated impact zone within which the CMC is met depends on the size of the regulatory mixing zone as specified in the State Water Quality Standards. In this analysis, they are calculated in the following steps:

1. The length of the regulatory mixing zone = 5,000 ft (5 times the river width)
2. The width of the regulatory mixing zone = 500 ft (one-half of the river width)
3. The CMC should be met within 10% of the lateral distance from the edge of the outfall structure (the drainage ditch in this case) to the edge of the mixing zone = 50 ft (10% of 500 ft)
4. The CMC should be met within a distance of 50 times the discharge length scale in any spatial direction = 66.5 ft (50 times of 1.35 ft, which is the discharge length scale for a 1.5-ft diameter pipe).
5. The CMC should be met within a distance of five times the local water depth = 60 ft (5 times 12 ft)

Based on the above guidelines, the regulatory mixing zone is defined by a rectangle of 5,000 ft (along the river) and 500 ft (across the river). The CCC should be met at the edge of this rectangle. The allocated impact zone is a semi-circle with a radius of 50 ft. As such, the CMC should be met at the edge of this zone.

4.3 Hydraulic Geometry and Ambient Transport Coefficients

The cross-sectional area of the river channel at the study site under tidally averaged conditions is approximately 13,345 ft^2. The average depth is 13.3 ft. Under the 1Q10 low flow of 648 cfs in the study area, the tidally averaged velocity in the James River is 0.049 ft/s. The tidally

average velocity under the 7Q10 low flow condition is 0.054 ft/s.

Longitudinal and lateral dispersion coefficient values need to be assigned. Lung (1995) used a longitudinal dispersion coefficient of 10 ft^2/s and a lateral dispersion coefficient of 1 ft^2/s for the Falling Creek mixing zone study. These values are used for this modeling analysis.

5. Model Results

5.1 Evaluation of Whole Effluent Toxicity

The model based on Eq. 2 is applied to the DuPont Polyester Plant discharge with the following data:

- Effluent flow rate = 0.3425 MGD
- Effluent acute toxicity = 1.0 TU_a (LC_{50} = 100% from recent monitoring, 1998)
- Effluent chronic toxicity = 1.0 TU_c (NOEC = 100% from recent monitoring, 1998)
- River velocity = 0.049 ft/s (1Q10 low flow condition) and 0.054 ft/s (7Q10 low flow condition)
- Longitudinal dispersion coefficient = 10 ft^2/s
- Lateral dispersion coefficient = 1.0 ft^2/s
- River depth = 12 ft (average depth in near shore area)

Preliminary model simulation results show that the isopleth toxicity of 0.30 TU_a is so small under the 1Q10 low flow condition that it cannot be plotted together with the 50-ft allocated impact zone (AIZ). That is, the 0.30 TU_a isopleth is well within the AIZ. The model was run again with a hypothetically much higher effluent acute toxicity of 25 TU_a (corresponding to a 4% effluent). Results of this model run for acute toxicity are presented in Figure 3, in which three isopleth toxicity contours are shown. Contour No. 1 has a toxicity level of 0.30 TU_a, contour No. 2 represents the toxicity level of 0.20 TU_a, and contour No. 3 is 0.1 TU_a. Thus, an effluent acute toxicity of 25 TU_a would result in the 0.30 TU_a isopleth contour staying the allocated impact zone, meeting the water quality criteria. It is obvious that an effluent acute toxicity of 1 TU_a would meet the criteria.

Results of the model run for chronic toxicity are presented in Figure 4, showing isopleth contours of 0.30, 0.125, 0.10, and 0.04 TU_c generated from an effluent chronic toxicity of 25 TU_c under the 7Q10 low flow condition in the James Estuary. Also shown in Figure 4 is the regulatory mixing zone where a chronic toxicity level of 1 TU_c must be met. Note that the 0.04 TU_c isopleth contour is within the regulatory mixing zone of a rectangle of 5,000-ft length and 500-ft width, meeting the water quality criteria. Again, an chronic toxicity level of 1 TU_c as measured in the effluent of the DuPont Polyester Films Plant would result in much lower concentration (i.e., 0.002 TU_c).

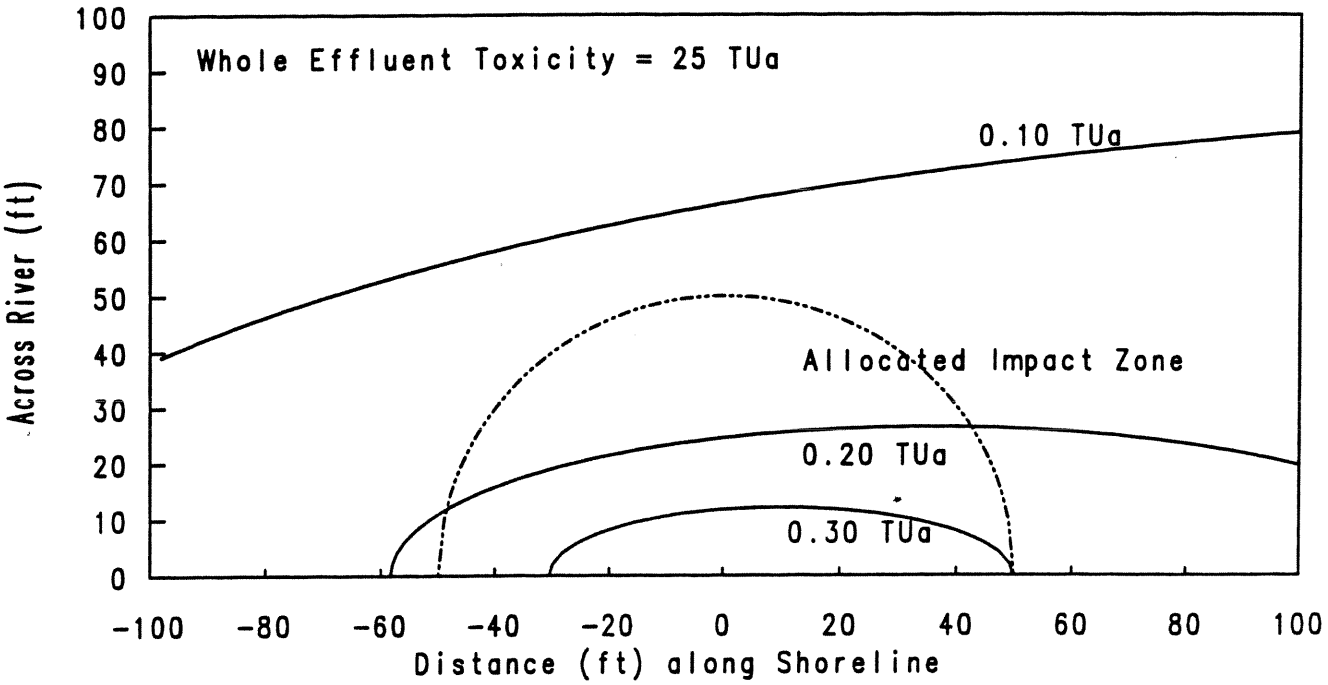

Figure 3. Model Calculated Isopleths with Whole Effluent Toxicity = 25 TU_a

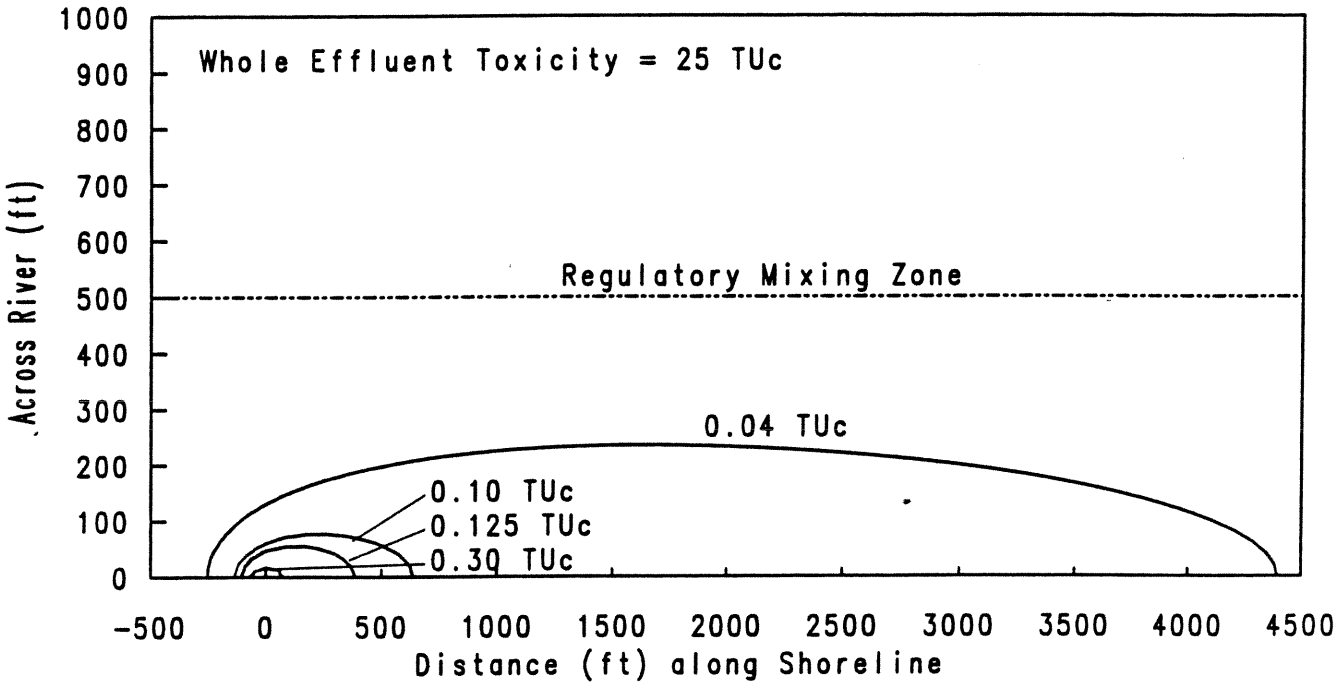

Figure 4. Model Calculated Isopleths with Whole Effluent Toxicity = 25 TU_c

5.2 Modeling Other Contaminants

Model results presented in Figure 3 indicate that a dilution ratio of 83.33 (= 25/0.30) can be achieved at the edge of the allocated impact zone (AIZ). Figure 4 shows that a dilution ratio of 625 (= 25/0.04) can be achieved at the edge of the regulatory mixing zone (RMZ). Based on these two dilution ratios, the concentrations of other contaminants at the edge of AIZ and RMZ can be calculated and are summarized in Table 1.

Table 1 - Summary of Mixing Zone Modeling of Contaminants (0.3425 MGD)

Contaminant	Eff. Conc.	Conc. at edge of AIZ[a]	Acute Standard	Conc. at edge of RMZ[b]	Chronic Standard
Acute Toxicity (TU_a)	1.0[c]	0.012	0.30		
Chronic Toxicity (TU_c)	1.0[c]			0.002	1.0
Cadmium (µg/L)	2	0.024	2.35	0.003	0.79
Copper (µg/L)	29	0.348	11.6	0.046	8
Chromium III (µg/L)	12	0.144	1,197	0.019	143
Iron (µg/L)	1130	13.56		1.808	
Nickel (µg/L)	91	1.092	966	0.146	107
Selenium (µg/L)	7	0.084	20	0.011	5
Zinc (µg/L)	430	5.16	79	0.688	72
Dis. Cadmium (µg/L)	2	0.024		0.003	
Dis. Iron (µg/L)	800	9.6		1.28	
Dis. Manganese (µg/L)	543	6.516		0.869	
Dis. Nickel (µg/L)	91	1.092		0.146	
Dis. Selenium (µg/L)	7	0.084		0.011	
Dis. Zinc (µg/L)	420	5.04		0.672	

a. 1Q10 low flow condition
b. 7Q10 low flow condition
c. Coastal Bioanalysts, Inc. (1998)

Table 1 shows that all concentrations at the edge of the AIZ are much lower than the acute standard. All concentrations at the edge of the RMZ are lower than the chronic standard. It should be pointed out that the calculated concentrations in AIZ and RMZ are based on maximum effluent concentrations measured at the outfall, representing a very conservative result.

6. Summary and Conclusions

A mixing zone model is developed for the DuPont Polyester Films Plant discharge in Hopewell, Virginia. The model is configured to quantify toxicity levels and chemical concentrations within the allocated impact zone and regulatory mixing zone. Recent monitoring data at the plant is used to derive the effluent levels of acute toxicity, chronic toxicity, and chemicals. The model is applied to two low flow conditions (1Q10 and 7Q10) to assess the mixing in the allocated impact zone and regulatory mixing zone, respectively.

Model results show that CMC of 0.3 TU_a and CCC of 1 TU_c in the effluent flow of 0.3425 MGD are easily met at the edge of the allocated impact zone and regulatory mixing zone, respectively. Chemical concentrations calculated in these two zones are much lower than the water quality standards at the edge of the chronic zone.

References Cited

1. EPA, 1991. Technical Support Document for Water Quality-based Toxics Control. EPA/505/2-90-001.
2. Fischer, H.B., List, E.J., Koh, R.C.Y., Imberger, J., and Brooks, N.H., 1979. Mixing in Inland and Coastal Waters. Academic Press, pp.113-120.
3. Lung, W.S., 1995. Mixing-Zone Modeling for Toxic Waste-Load Allocations. *Journal of Environmental Engineering*, 121(11):839-842.

Allied (Hopewell)	165.00	2750		10326		6.1		2750		10326		6.1
Hopewell Regional WTF	34.07	12502	44.0	12091	36.2	4.8		12502	44.0	10291	36.2	4.8
Petersburg STP	15.00	2802	22.4	801	6.4	5.0		2802	22.4	2028	16.2	5.0
TOTAL	380.81	31084		28978				36679	35958			

1 NH3-N values represent ammonia as nitrogen.

2 Dissolved oxygen limits represent average minimum allowable levels.

3 Allied (Hopewell) allocation may be redistributed to the Hopewell Regional WTF by VPDES permit.

TABLE B7- WASTE LOAD ALLOCATION FOR THE YEAR 2000

	SUMMER (June-October)							WINTER (November-May)				
	FLOW (mgd)	CBOD5		NH3-N1,3		DO2 (mg/l)		CBOD5		NH3-N1		DO2 (mg/l)
		(lbs/d)	(mg/l)	(lbs/d)	(mg/l)			(lbs/d)	(mg/l)	(lbs/d)	(mg/l)	
City of Richmond STP	45.08	3002	8.0	2403	6.4	5.6		5367	14.3	5707	15.2	5.6
E.I. DuPont-Spruance	196.99	948		590		4.4		948		756		2.9
Falling Creek STP	10.10	1348	16.0	539	6.4	5.9		2023	24.0	1281	15.2	5.9
Proctor's Creek STP	16.80	1602	11.4	961	6.9	5.9		2403	17.1	1402	10.0	5.9
Reynolds Metals Co.	0.78	172		13		6.5		172		13		6.5
Henrico STP	32.80	3002	11.0	2403	8.8	5.6		4756	17.4	3504	12.8	5.6
American Tobacco Co.	3.00	715		113		5.8		715		113		5.8
ICI Americas, Inc.	0.20	167		8		5.8		167		8		3.1
Phillip Morris- Park 500	2.90	819		92		4.6		819		92		4.6
Allied (Chesterfield)	56.00	1255		442		5.7		1255		442		5.7
Allied (Hopewell)	170.00	2750		10326		6.1		2750		10326		6.1
Hopewell Regional WTF	36.78	12502	40.7	12091	33.5	4.8		12502	40.7	10291	33.5	4.8
Petersburg STP	15.00	2802	22.4	801	6.4	5.0		2802	22.4	2028	16.2	5.0
TOTAL	406.43	31084		28982				36679		35963		

1 NH3-N values represent ammonia as nitrogen.

2 Dissolved oxygen limits represent average minimum allowable levels.

3 Allied (Hopewell) allocation may be redistributed to the Hopewell Regional WTF by VPDES permit.

TABLE B7- WASTE LOAD ALLOCATIONS FOR THE YEAR 2010

	SUMMER (June-October)							WINTER (November-May)				
	FLOW (mgd)	CBOD5		NH3-N1,3		DO2 (mg/l)		CBOD5		NH3-N1		DO2 (mg/l)
		(lbs/d)	(mg/l)	(lbs/d)	(mg/l)			(lbs/d)	(mg/l)	(lbs/d)	(mg/l)	
City of Richmond STP	45.86	3002	7.8	2403	6.3	5.6		5367	14.0	5707	14.9	5.6
E.I. DuPont-Spruance	16.99	948		590		4.4		948		756		2.9
Falling Creek STP	10.10	1348	16.0	539	6.4	5.9		2023	24.0	1281	15.2	5.9
Proctor's Creek STP	24.00	1602	8.0	961	4.8	5.9		2403	12.0	1402	7.0	5.9
Reynolds Metals Co.	0.78	172		13		6.5		172		13		6.5
Henrico STP	38.07	3002	9.5	2403	7.6	5.6		4756	15.0	3504	11.0	5.6
American Tobacco Co.	3.00	715		113		5.8		715		113		5.8
ICI Americas, Inc.	0.20	167		8		5.8		167		8		3.1
Phillip Morris- Park 500	2.90	819		92		4.6		819		92		4.6
Allied (Chesterfield)	56.00	1255		442		5.7		1255		442		5.7
Allied (Hopewell)	180.00	2750		10326		6.1		2750		10326		6.1
Hopewell Regional WTF	39.61	12502	37.8	10291	31.1	4.8		12502	37.8	10291	31.1	4.8
Petersburg STP	15.00	2802	22.4	801	6.4	5.0		2802	22.4	2028	16.2	5.0
TOTAL	432.1	31084		28982				36679		35963		

1 NH3-N values represent ammonia as nitrogen.

2 Dissolved oxygen limits represent average minimum allowable levels.

3 Allied (Hopewell) allocation may be redistributed to the Hopewell Regional WTF by VPDES permit.

ATTACHMENT 11

001 EFFLUENT LIMITATIONS

The following effluent limitations were calculated using the procedure described in a memorandum dated July 11, 1986 from Vince Carpano (attached) usint the 1985 effluent data provided by ICI (Attachment 10).

Flow:

average:

$\bar{x}$ = 0.107256 MGD
sd = 0.03266 MGD

P_{99} = 0.107256 + 2.33(0.03266)
= 0.1833538 MGD

maximum:

ln $\bar{x}$ = 11.515
ln sd= 0.3848

$P_{99} = e^{11.515 + 2.33(0.3848)}$
= 0.2456306 MGD

BOD_5:

average:

$\bar{x}$ = 34 mg/l
sd = 28 mg/l

P_{99} = 34 + 2.33(28)
= 99.24 mg/l

99.24 mg/l x 0.1833538 MGD x 8.34 = 152 #/d

maximum:

ln $\bar{x}$ = 3.041
ln sd= 0.9325

$P_{99} = e^{3.041 + 2.33(0.9325)}$
= 183.77736 mg/l

183.77736 mg/l x 0.2456306 MGD x 8.34 = 376 #/d

TSS:

average: $\bar{x}$= 52 mg/l
sd= 40 mg/l

P99 = 52 + 2.33(40)
= 145.2 mg/l

145.2 mg/l x 0.1833538 MGD x 8.34 = 222 #/d

maximum: ln $\bar{x}$= 3.4344
ln sd= 1.1047

$P_{99} = e^{3.4344 + 2.3(1.1047)}$
406.81193 mg/l

406.81193 mg/l x 0.2456306 MGD x 8.34 = 833 #/d

This maximum limitation is not reasonable based on the data distribution. Therefore, a non-parametric ranking method was used. Using the second highest concentration of 180 mg/l (the 98th percentile), the daily maximum limitation is as follows:

180 mg/l x 0.2456306 x 8.34 = 369 #/d

NPDES
Final Outfall

Attachment 10

1985

Date	Flow G/Day	BOD mg/l	BOD #/Day	TSS mg/l	TSS #/Day
Jan. 2	75,000	28	17.51	111	69.40
9	80,000	32	21.35	166	110.75
16	81,600	58	39.47	55	37.43
23	128,310	119	127.34	42	44.94
30	65,300	222	120.90	180	98.00
Feb. 6	75,000	155	96.95	231	144.49
14	74,600	144	89.59	134	83.37
20	76,500	46	29.35	138	88.05
27	70,300	18	10.55	64	37.52
Mar. 6	146,790	14	17.14	116	142.02
13	98,300	16	13.12	116	95.10
20	80,300	78	52.24	81	54.24
27	76,220	15	9.54	22	13.98
Apr. 3	73,320	16	9.78	20	12.23
10	77,510	13	8.19	21	13.22
17	100,630	25	20.98	17	14.27
24	92,240	15	11.54	41	31.54
May 1	82,910	18	12.45	33	22.82
8	75,040	15	9.39	10.2	6.38
15	58,030	20	9.68	11	5.32
23	152,900	19	24.23	34	43.36
29	127,280	26	27.60	79	83.86
June 5	129,990	13	14.09	37	40.11
12	60,100	16	8.02	38	19.05
26	45,100	8	3.01	34	12.79
July 5	43,070	38	13.65	56	19.01
10	79,110	20	13.20	15	9.90
17	61,270	79	40.37	60	30.66
24	91,490	20	15.26	6	4.58
Aug. 7	95,390	57	45.35	28	22.28
14	129,000	23	24.74	18	19.37
21	203,670	7	11.89	8	15.59
29	154,260	12	15.44	10	12.87
Sept. 4	197,180	5	8.22	4	6.58
11	196,130	8	13.09	4	6.54
18	137,670	11	12.63	7	8.04
25	171,790	6	8.60	3	4.30
Oct. 2	271,090	4	9.04	6	10.86
9	93,840	6	4.70	7	5.48
16	153,010	16	20.42	30	38.28
23	146,410	11	13.43	29	35.41
30	103,020	7	6.01	25	21.48
Nov. 6	110,170	11	10.11	47	43.18
13	104,800	9	7.87	24	20.98
20	96,380	16	12.86	72	57.87
27	104,470	32	27.88	112	97.58
Dec. 4	98,440	25	20.52	87	71.42
11	142,080	7	8.29	7	8.29
18	107,190	67	49.89	93	83.13
27	114,452	78	74.45	28	26.73

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MEMORANDUM

State Water Control Board

2111 North Hamilton Street P. O. Box 11143 Richmond, VA. 23230

SUBJECT: Organic Chemicals Facilities NPDES Permits
Calculation Method for BPT/BCT

TO: C. W. Maus (PRO); R. G. Burnley (WCRO); D. A.Mashaw (TRO); Jim Preston (VRO); Ray Jenkins (PRO)

FROM: Vince Carpano, OWRM-Technical Assistance

DATE: July 11, 1986

COPIES: OWRM File

Martin Ferguson suggested that I forward to you the procedure that will be used for calculating BPJ for BPT/BCT and BAT limitations for subject permits for those categories that are not covered by promulgated guidelines.

The method that has been used in the past is a satisfactory method if the data used is normally distributed. In the case of organic chemical industries, EPA found that the lognormal procedure should be used (see Selected Summary of Information in Support of the Organic Chemicals Plastic and Synthetic Fibers Point Source Category - Notice of Availability of New Information dated July 1985).

In order to use this method the individual daily data is required to make the calculations. The method for calculation of the daily maximum concentration is as follows:

1. Transform the daily numbers to their natural logarithims values.

   X_i = daily concentration value

   $Y_i = \ln (X_i)$

   N = number of values

2. Determine the standard deviation of the Y_i's.

$$S_Y = \sqrt{\frac{\sum_{i=1}^{N} (\bar{Y}_i - Y_i)^2}{N - 1}}$$

3. Determine the Mean of the Y_i's.

$$u = \frac{\sum_{i=1}^{N} Y_i}{N}$$

4. P_{99} is the 99th percentile

Daily max = $P_{99} = e^{(u+2.33G)}$

NOTE: **Use a minimum of one year's data, preferably this past year's data.**

Using the lognormal method outline in the EPA document for calculating monthly averages is more complicated and not in a useable form. Since it is fair to assume that the monthly averages reported in the DMR's are normally distributed we will use the usual method for the determination of the monthly average as noted below:

X_i = monthly average value

$$\bar{X} = \frac{\sum X_i}{N} = \text{mean of monthly average values}$$

$$s_x = \sqrt{\frac{\sum_{i=1}^{N} (\bar{X} - X_i)^2}{N-1}}$$

P_{99} is the 99th Pecentile

Monthly Ave = $P_{99} = \bar{X} + 2.33 s_x$

Note if the amount of data is limited and the results are not reasonable using for example only 12 pieces of data then a ranking method may be used. Call Vincent Carpano for details if you run into such a situation.

:VAC013/scj

ATTACHMENT 12

CHLORINE CALCULATIONS

Refer to attached page from a memorandum dated January 3, 1983, from M. D. Phillips.

Maximum flow 0.2456306 MGD (from Attachment 11)

Cl_d = 0.011 mg/l (chlorine standard)
W = ?
A = 18,450 ft^2 = 1714 m^2

$$u = \frac{Q}{A}. \qquad Q = 631 \text{ cfs}.$$

$$= \frac{631 \text{ cfs}}{1714 \text{ m}^2} \times 0.02832 \text{ m}^3/\text{ft}^3 \times 60 \text{ sec/min}$$

$$\times 60 \text{ min/hour} \times 24 \text{ hrs/day} = 901 \text{ m/day}$$

$K_c = 1.0$

$E = 2.59 \times 10^6 \text{ m}^2/\text{day}$

$$0.011 = \frac{W}{1714\ (901^2 + 4(1)\ (2.59 \times 10^6))^{\frac{1}{2}}}$$

W = 63018.07 grams/day

$$\text{Allowable effluent concentration} = \frac{63018.07 \text{ gr/day} \times 1000 \text{ mg/gr}}{245630.6 \text{ gals/day} \times 3.785 \text{ l/gal}}$$

$$= 68 \text{ mg/l}$$

Chlorine is used in the utility cooling tower and to disinfect the discharge from the sewage treatment plant. Based on mass balance calculations, the staff originally considered a daily maximum total residual chlorine limitation of 0.2 mg/l on Outfall 001. The Company requested that a limitation of 0.5 mg/l be considered to avoid problems related to analytical accuracy. As 0.5 mg/l is well below the allowable discharge concentration of 68 mg/l, a daily maximum limitation of 0.5 mg/l is proposed.

bis(dichloroisopropyl) ether, bis-(chloroethoxy) methane and polychlorinated diphenyl ethers)
38. Halomethanes (other than those listed elsewhere; includes methylene chloride, methylchloride, methylbromide, bromoform, dichlorobromomethane
39. Heptachlor and metabolites
40. Hexachlorobutadiene
41. Hexachlorocyclohexane
42. Hexachlorocyclopentadiene
43. Isophorone
44. Lead and compounds
45. Mercury and compounds
46. Naphthalene
47. Nickel and compounds
48. Nitrobenzene
49. Nitrophenols (including 2,4-dinitrophenol, dinitrocresol)
50. Nitrosamines
51. Pentachlorophenol
52. Phenol
53. Phthalate esters
54. Polychlorinated biphenyls (PCBs)[1]
55. Polynuclear aromatic hydrocarbons (including benzanthracenes, benzopyrenes, benzofluoranthene, chrysenes, dibenzanthracenes, and indenopyrenes)
56. Selenium and compounds
57. Silver and compounds
58. 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD)
59. Tetrachloroethylene
60. Thallium and compounds
61. Toluene
62. Toxaphene[1]
63. Trichloroethylene
64. Vinyl chloride
65. Zinc and compounds

[44 FR 44502, July 30, 1979, as amended at 46 FR 2266, Jan. 8, 1981; 46 FR 10724, Feb. 4, 1981]

§ 401.16 Conventional pollutants.

The following comprise the list of conventional pollutants designated pursuant to section 304(a)(4) of the Act:

1. Biochemical oxygen demand (BOD)
2. Total suspended solids (nonfilterable) (TSS)
3. pH
4. Fecal coliform
5. Oil and grease

[44 FR 44503, July 30, 1979; 44 FR 52685, Sept. 10, 1979]

§ 401.17 pH Effluent limitations under continuous monitoring.

(a) Where a permittee continuously measures the pH of wastewater pursuant to a requirement or option in a National Pollutant Discharge Elimination System (NPDES) permit issued pursuant to section 402 of the Act, the permittee shall maintain the pH of such wastewater within the range set forth in the applicable effluent limitations guidelines, except excursions from the range are permitted subject to the following limitations:

(1) The total time during which the pH values are outside the required range of pH values shall not exceed 7 hours and 26 minutes in any calendar month; and

(2) No individual excursion from the range of pH values shall exceed 60 minutes.

(b) The Director, as defined in §122.3 of this chapter, may adjust the requirements set forth in paragraph (a) of this section with respect to the length of individual excursions from the range of pH values, if a different period of time is appropriate based upon the treatment system, plant configuration or other technical factors.

(c) For purposes of this section, an *excursion* is an unintentional and temporary incident in which the pH value of discharge wastewater exceeds the range set forth in the applicable effluent limitations guidelines.

(Secs. 301, 304, 306 and 501 of the Clean Water Act (the Federal Water Pollution Control Act Amendments of 1972, 33 U.S.C. 1251 et. seq., as amended by the Clean Water Act of 1977, Pub. L. 95–217))

[47 FR 24537, June 4, 1982]

PART 402 [RESERVED]

PART 403—GENERAL PRE-TREATMENT REGULATIONS FOR EXISTING AND NEW SOURCES OF POLLUTION

Sec.
403.1 Purpose and applicability.
403.2 Objectives of general pretreatment regulations.
403.3 Definitions.
403.4 State or local law.
403.5 National pretreatment standards: Prohibited discharges.
403.6 National pretreatment standards: Categorical standards.
403.7 Removal credits.
403.8 Pretreatment Program Requirements: Development and Implementation by POTW.
403.9 POTW pretreatment programs and/or authorization to revise pretreatment standards: Submission for approval.

MSTRANTI DATA SOURCE REPORT

(DuPont Teijin Outfall 001)

Stream Information	
Mean Hardness	Ambient Data (2-JMS087.01).
90% Temperature (annual)	
90% Temperature (wet season)	
90% Maximum pH	
10% Maximum pH	
Tier Designation	Flow Frequency Memo (11/2/10)
Stream Flows & Mixing Information	
All Data	Lung Mixing Model (1998).
Effluent Information	
Mean Hardness	App Data
90% Temperature (annual)	Max temperature reported on the Application serves as a surrogate for P90. Given the limited data set, the max value is the best estimate available.
90% Temperature (wet season)	NA
90% Maximum pH	DMR data
10% Maximum pH	DMR data
Discharge Flow	Used a value of 1 for simplicity in applying mixing ratios

Data Location:

Ambient Data – Attachment A
Flow Frequency Analysis – Attachment A
App Data – Attachment E
DMR Data – Attachment E
Lung Mixing Model – Attachment F

FRESHWATER
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: DuPont Teijin Permit No.: VA0003077

Receiving Stream: James River (Lower) Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information			Stream Flows			Mixing Information			Effluent Information		
Mean Hardness (as CaCO3) =	66.7	mg/L	1Q10 (Annual) =	82.33	MGD	Annual - 1Q10 Mix =	100	%	Mean Hardness (as CaCO3) =	85	mg/L
90% Temperature (Annual) =	30.6	deg C	7Q10 (Annual) =	624	MGD	- 7Q10 Mix =	100	%	90% Temp (Annual) =	27	deg C
90% Temperature (Wet season) =	NA	deg C	30Q10 (Annual) =	624	MGD	- 30Q10 Mix =	100	%	90% Temp (Wet season) =	NA	deg C
90% Maximum pH =	8	SU	1Q10 (Wet season) =		MGD	Wet Season - 1Q10 Mix =	100	%	90% Maximum pH =	9	SU
10% Maximum pH =	7.1	SU	30Q10 (Wet season) =		MGD	- 30Q10 Mix =	100	%	10% Maximum pH =	8.6	SU
Tier Designation (1 or 2) =	1		30Q5 =	624	MGD				Discharge Flow =	1	MGD
Public Water Supply (PWS) Y/N? =	Y		Harmonic Mean =	624	MGD						
Trout Present Y/N? =	N										
Early Life Stages Present Y/N? =	Y										

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Acenapthene	5	--	--	6.7E+02	9.9E+02	--	--	4.2E+05	6.2E+05	--	--	--	--	--	--	--	--	**--**	**--**	**4.2E+05**	**6.2E+05**
Acrolein	0	--	--	6.1E+00	9.3E+00	--	--	3.8E+03	5.8E+03	--	--	--	--	--	--	--	--	**--**	**--**	**3.8E+03**	**5.8E+03**
Acrylonitrile [C]	0	--	--	5.1E-01	2.5E+00	--	--	3.2E+02	1.6E+03	--	--	--	--	--	--	--	--	**--**	**--**	**3.2E+02**	**1.6E+03**
Aldrin [C]	0	3.0E+00	--	4.9E-04	5.0E-04	2.5E+02	--	3.1E-01	3.1E-01	--	--	--	--	--	--	--	--	**2.5E+02**	**--**	**3.1E-01**	**3.1E-01**
Ammonia-N (mg/l) (Yearly)	0	8.33E+00	8.62E-01	--	--	6.94E+02	5.39E+02	--	--	--	--	--	--	--	--	--	--	**6.94E+02**	**5.39E+02**	**--**	**--**
Ammonia-N (mg/l) (High Flow)	0	1.32E+00	#VALUE!	--	--	1.32E+00	#VALUE!	--	--	--	--	--	--	--	--	--	--	**1.32E+00**	**#VALUE!**	**--**	**--**
Anthracene	0	--	--	8.3E+03	4.0E+04	--	--	5.2E+06	2.5E+07	--	--	--	--	--	--	--	--	**--**	**--**	**5.2E+06**	**2.5E+07**
Antimony	0	--	--	5.6E+00	6.4E+02	--	--	3.5E+03	4.0E+05	--	--	--	--	--	--	--	--	**--**	**--**	**3.5E+03**	**4.0E+05**
Arsenic	o	3.4E+02	1.5E+02	1.0E+01	--	2.8E+04	9.4E+04	6.3E+03	--	--	--	--	--	--	--	--	--	**2.8E+04**	**9.4E+04**	**6.3E+03**	**--**
Barium	0	--	--	2.0E+03	--	--	--	1.3E+06	--	--	--	--	--	--	--	--	--	**--**	**--**	**1.3E+06**	**--**
Benzene [C]	0	--	--	2.2E+01	5.1E+02	--	--	1.4E+04	3.2E+05	--	--	--	--	--	--	--	--	**--**	**--**	**1.4E+04**	**3.2E+05**
Benzidine [C]	0	--	--	8.6E-04	2.0E-03	--	--	5.4E-01	1.3E+00	--	--	--	--	--	--	--	--	**--**	**--**	**5.4E-01**	**1.3E+00**
Benzo (a) anthracene [C]	0	--	--	3.8E-02	1.8E-01	--	--	2.4E+01	1.1E+02	--	--	--	--	--	--	--	--	**--**	**--**	**2.4E+01**	**1.1E+02**
Benzo (b) fluoranthene [C]	0	--	--	3.8E-02	1.8E-01	--	--	2.4E+01	1.1E+02	--	--	--	--	--	--	--	--	**--**	**--**	**2.4E+01**	**1.1E+02**
Benzo (k) fluoranthene [C]	0	--	--	3.8E-02	1.8E-01	--	--	2.4E+01	1.1E+02	--	--	--	--	--	--	--	--	**--**	**--**	**2.4E+01**	**1.1E+02**
Benzo (a) pyrene [C]	0	--	--	3.8E-02	1.8E-01	--	--	2.4E+01	1.1E+02	--	--	--	--	--	--	--	--	**--**	**--**	**2.4E+01**	**1.1E+02**
Bis2-Chloroethyl Ether [C]	0	--	--	3.0E-01	5.3E+00	--	--	1.9E+02	3.3E+03	--	--	--	--	--	--	--	--	**--**	**--**	**1.9E+02**	**3.3E+03**
Bis2-Chloroisopropyl Ether	0	--	--	1.4E+03	6.5E+04	--	--	8.8E+05	4.1E+07	--	--	--	--	--	--	--	--	**--**	**--**	**8.8E+05**	**4.1E+07**
Bis 2-Ethylhexyl Phthalate [C]	0	--	--	1.2E+01	2.2E+01	--	--	7.5E+03	1.4E+04	--	--	--	--	--	--	--	--	**--**	**--**	**7.5E+03**	**1.4E+04**
Bromoform [C]	0	--	--	4.3E+01	1.4E+03	--	--	2.7E+04	8.8E+05	--	--	--	--	--	--	--	--	**--**	**--**	**2.7E+04**	**8.8E+05**
Butylbenzylphthalate	0	--	--	1.5E+03	1.9E+03	--	--	9.4E+05	1.2E+06	--	--	--	--	--	--	--	--	**--**	**--**	**9.4E+05**	**1.2E+06**
Cadmium	0	2.5E+00	8.3E-01	5.0E+00	--	2.1E+02	5.2E+02	3.1E+03	--	--	--	--	--	--	--	--	--	**2.1E+02**	**5.2E+02**	**3.1E+03**	**--**
Carbon Tetrachloride [C]	0	--	--	2.3E+00	1.6E+01	--	--	1.4E+03	1.0E+04	--	--	--	--	--	--	--	--	**--**	**--**	**1.4E+03**	**1.0E+04**
Chlordane [C]	0	2.4E+00	4.3E-03	8.0E-03	8.1E-03	2.0E+02	2.7E+00	5.0E+00	5.1E+00	--	--	--	--	--	--	--	--	**2.0E+02**	**2.7E+00**	**5.0E+00**	**5.1E+00**
Chloride	0	8.6E+05	2.3E+05	2.5E+05	--	7.2E+07	1.4E+08	1.6E+08	--	--	--	--	--	--	--	--	--	**7.2E+07**	**1.4E+08**	**1.6E+08**	**--**
TRC	0	1.9E+01	1.1E+01	--	--	1.6E+03	6.9E+03	--	--	--	--	--	--	--	--	--	--	**1.6E+03**	**6.9E+03**	**--**	**--**
Chlorobenzene	0	--	--	1.3E+02	1.6E+03	--	--	8.1E+04	1.0E+06	--	--	--	--	--	--	--	--	**--**	**--**	**8.1E+04**	**1.0E+06**
Chlorodibromomethane [C]	0	--	--	4.0E+00	1.3E+02	--	--	2.5E+03	8.1E+04	--	--	--	--	--	--	--	--	**--**	**--**	**2.5E+03**	**8.1E+04**
Chloroform	0	--	--	3.4E+02	1.1E+04	--	--	2.1E+05	6.9E+06	--	--	--	--	--	--	--	--	**--**	**--**	**2.1E+05**	**6.9E+06**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
2-Chloronaphthalene	0	--	--	1.0E+03	1.6E+03	--	--	6.3E+05	1.0E+06	--	--	--	--	--	--	--	--	**--**	**--**	**6.3E+05**	**1.0E+06**
2-Chlorophenol	0	--	--	8.1E+01	1.5E+02	--	--	5.1E+04	9.4E+04	--	--	--	--	--	--	--	--	**--**	**--**	**5.1E+04**	**9.4E+04**
Chlorpyrifos	0	8.3E-02	4.1E-02	--	--	6.9E+00	2.6E+01	--	--	--	--	--	--	--	--	--	--	**6.9E+00**	**2.6E+01**	**--**	**--**
Chromium III	0	4.1E+02	5.3E+01	--	--	3.4E+04	3.3E+04	--	--	--	--	--	--	--	--	--	--	**3.4E+04**	**3.3E+04**	**--**	**--**
Chromium VI	0	1.6E+01	1.1E+01	--	--	1.3E+03	6.9E+03	--	--	--	--	--	--	--	--	--	--	**1.3E+03**	**6.9E+03**	**--**	**--**
Chromium, Total	0	--	--	1.0E+02	--	--	--	6.3E+04	--	--	--	--	--	--	--	--	--	**--**	**--**	**6.3E+04**	**--**
Chrysene [C]	0	--	--	3.8E-03	1.8E-02	--	--	2.4E+00	1.1E+01	--	--	--	--	--	--	--	--	**--**	**--**	**2.4E+00**	**1.1E+01**
Copper	0	9.2E+00	6.3E+00	1.3E+03	--	7.7E+02	4.0E+03	8.1E+05	--	--	--	--	--	--	--	--	--	**7.7E+02**	**4.0E+03**	**8.1E+05**	**--**
Cyanide, Free	0	2.2E+01	5.2E+00	1.4E+02	1.6E+04	1.8E+03	3.3E+03	8.8E+04	1.0E+07	--	--	--	--	--	--	--	--	**1.8E+03**	**3.3E+03**	**8.8E+04**	**1.0E+07**
DDD [C]	0	--	--	3.1E-03	3.1E-03	--	--	1.9E+00	1.9E+00	--	--	--	--	--	--	--	--	**--**	**--**	**1.9E+00**	**1.9E+00**
DDE [C]	0	--	--	2.2E-03	2.2E-03	--	--	1.4E+00	1.4E+00	--	--	--	--	--	--	--	--	**--**	**--**	**1.4E+00**	**1.4E+00**
DDT [C]	0	1.1E+00	1.0E-03	2.2E-03	2.2E-03	9.2E+01	6.3E-01	1.4E+00	1.4E+00	--	--	--	--	--	--	--	--	**9.2E+01**	**6.3E-01**	**1.4E+00**	**1.4E+00**
Demeton	0	--	1.0E-01	--	--	--	6.3E+01	--	--	--	--	--	--	--	--	--	--	**--**	**6.3E+01**	**--**	**--**
Diazinon	0	1.7E-01	1.7E-01	--	--	1.4E+01	1.1E+02	--	--	--	--	--	--	--	--	--	--	**1.4E+01**	**1.1E+02**	**--**	**--**
Dibenz(a,h)anthracene [C]	0	--	--	3.8E-02	1.8E-01	--	--	2.4E+01	1.1E+02	--	--	--	--	--	--	--	--	**--**	**--**	**2.4E+01**	**1.1E+02**
1,2-Dichlorobenzene	0	--	--	4.2E+02	1.3E+03	--	--	2.6E+05	8.1E+05	--	--	--	--	--	--	--	--	**--**	**--**	**2.6E+05**	**8.1E+05**
1,3-Dichlorobenzene	0	--	--	3.2E+02	9.6E+02	--	--	2.0E+05	6.0E+05	--	--	--	--	--	--	--	--	**--**	**--**	**2.0E+05**	**6.0E+05**
1,4-Dichlorobenzene	0	--	--	6.3E+01	1.9E+02	--	--	3.9E+04	1.2E+05	--	--	--	--	--	--	--	--	**--**	**--**	**3.9E+04**	**1.2E+05**
3,3-Dichlorobenzidine [C]	0	--	--	2.1E-01	2.8E-01	--	--	1.3E+02	1.8E+02	--	--	--	--	--	--	--	--	**--**	**--**	**1.3E+02**	**1.8E+02**
Dichlorobromomethane [C]	0	--	--	5.5E+00	1.7E+02	--	--	3.4E+03	1.1E+05	--	--	--	--	--	--	--	--	**--**	**--**	**3.4E+03**	**1.1E+05**
1,2-Dichloroethane [C]	0	--	--	3.8E+00	3.7E+02	--	--	2.4E+03	2.3E+05	--	--	--	--	--	--	--	--	**--**	**--**	**2.4E+03**	**2.3E+05**
1,1-Dichloroethylene	0	--	--	3.3E+02	7.1E+03	--	--	2.1E+05	4.4E+06	--	--	--	--	--	--	--	--	**--**	**--**	**2.1E+05**	**4.4E+06**
1,2-trans-dichloroethylene	0	--	--	1.4E+02	1.0E+04	--	--	8.8E+04	6.3E+06	--	--	--	--	--	--	--	--	**--**	**--**	**8.8E+04**	**6.3E+06**
2,4-Dichlorophenol	0	--	--	7.7E+01	2.9E+02	--	--	4.8E+04	1.8E+05	--	--	--	--	--	--	--	--	**--**	**--**	**4.8E+04**	**1.8E+05**
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	1.0E+02	--	--	--	6.3E+04	--	--	--	--	--	--	--	--	--	**--**	**--**	**6.3E+04**	**--**
1,2-Dichloropropane [C]	0	--	--	5.0E+00	1.5E+02	--	--	3.1E+03	9.4E+04	--	--	--	--	--	--	--	--	**--**	**--**	**3.1E+03**	**9.4E+04**
1,3-Dichloropropene [C]	0	--	--	3.4E+00	2.1E+02	--	--	2.1E+03	1.3E+05	--	--	--	--	--	--	--	--	**--**	**--**	**2.1E+03**	**1.3E+05**
Dieldrin [C]	0	2.4E-01	5.6E-02	5.2E-04	5.4E-04	2.0E+01	3.5E+01	3.3E-01	3.4E-01	--	--	--	--	--	--	--	--	**2.0E+01**	**3.5E+01**	**3.3E-01**	**3.4E-01**
Diethyl Phthalate	0	--	--	1.7E+04	4.4E+04	--	--	1.1E+07	2.8E+07	--	--	--	--	--	--	--	--	**--**	**--**	**1.1E+07**	**2.8E+07**
2,4-Dimethylphenol	0	--	--	3.8E+02	8.5E+02	--	--	2.4E+05	5.3E+05	--	--	--	--	--	--	--	--	**--**	**--**	**2.4E+05**	**5.3E+05**
Dimethyl Phthalate	0	--	--	2.7E+05	1.1E+06	--	--	1.7E+08	6.9E+08	--	--	--	--	--	--	--	--	**--**	**--**	**1.7E+08**	**6.9E+08**
Di-n-Butyl Phthalate	0	--	--	2.0E+03	4.5E+03	--	--	1.3E+06	2.8E+06	--	--	--	--	--	--	--	--	**--**	**--**	**1.3E+06**	**2.8E+06**
2,4 Dinitrophenol	0	--	--	6.9E+01	5.3E+03	--	--	4.3E+04	3.3E+06	--	--	--	--	--	--	--	--	**--**	**--**	**4.3E+04**	**3.3E+06**
2-Methyl-4,6-Dinitrophenol	0	--	--	1.3E+01	2.8E+02	--	--	8.1E+03	1.8E+05	--	--	--	--	--	--	--	--	**--**	**--**	**8.1E+03**	**1.8E+05**
2,4-Dinitrotoluene [C]	0	--	--	1.1E+00	3.4E+01	--	--	6.9E+02	2.1E+04	--	--	--	--	--	--	--	--	**--**	**--**	**6.9E+02**	**2.1E+04**
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin	0	--	--	5.0E-08	5.1E-08	--	--	3.1E-05	3.2E-05	--	--	--	--	--	--	--	--	**--**	**--**	**3.1E-05**	**3.2E-05**
1,2-Diphenylhydrazine [C]	0	--	--	3.6E-01	2.0E+00	--	--	2.3E+02	1.3E+03	--	--	--	--	--	--	--	--	**--**	**--**	**2.3E+02**	**1.3E+03**
Alpha-Endosulfan	0	2.2E-01	5.6E-02	6.2E+01	8.9E+01	1.8E+01	3.5E+01	3.9E+04	5.6E+04	--	--	--	--	--	--	--	--	**1.8E+01**	**3.5E+01**	**3.9E+04**	**5.6E+04**
Beta-Endosulfan	0	2.2E-01	5.6E-02	6.2E+01	8.9E+01	1.8E+01	3.5E+01	3.9E+04	5.6E+04	--	--	--	--	--	--	--	--	**1.8E+01**	**3.5E+01**	**3.9E+04**	**5.6E+04**
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	1.8E+01	3.5E+01	--	--	--	--	--	--	--	--	--	--	**1.8E+01**	**3.5E+01**	**--**	**--**
Endosulfan Sulfate	0	--	--	6.2E+01	8.9E+01	--	--	3.9E+04	5.6E+04	--	--	--	--	--	--	--	--	**--**	**--**	**3.9E+04**	**5.6E+04**
Endrin	0	8.6E-02	3.6E-02	5.9E-02	6.0E-02	7.2E+00	2.3E+01	3.7E+01	3.8E+01	--	--	--	--	--	--	--	--	**7.2E+00**	**2.3E+01**	**3.7E+01**	**3.8E+01**
Endrin Aldehyde	0	--	--	2.9E-01	3.0E-01	--	--	1.8E+02	1.9E+02	--	--	--	--	--	--	--	--	**--**	**--**	**1.8E+02**	**1.9E+02**
Ethylbenzene	0	--	--	5.3E+02	2.1E+03	--	--	3.3E+05	1.3E+06	--	--	--	--	--	--	--	--	**--**	**--**	**3.3E+05**	**1.3E+06**
Fluoranthene	0	--	--	1.3E+02	1.4E+02	--	--	8.1E+04	8.8E+04	--	--	--	--	--	--	--	--	**--**	**--**	**8.1E+04**	**8.8E+04**
Fluorene	0	--	--	1.1E+03	5.3E+03	--	--	6.9E+05	3.3E+06	--	--	--	--	--	--	--	--	**--**	**--**	**6.9E+05**	**3.3E+06**
Foaming Agents	0	--	--	5.0E+02	--	--	--	3.1E+05	--	--	--	--	--	--	--	--	--	**--**	**--**	**3.1E+05**	**--**
Guthion	0	--	1.0E-02	--	--	--	6.3E+00	--	--	--	--	--	--	--	--	--	--	**--**	**6.3E+00**	**--**	**--**
Heptachlor [C]	0	5.2E-01	3.8E-03	7.9E-04	7.9E-04	4.3E+01	2.4E+00	4.9E-01	4.9E-01	--	--	--	--	--	--	--	--	**4.3E+01**	**2.4E+00**	**4.9E-01**	**4.9E-01**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Heptachlor Epoxide[C]	0	5.2E-01	3.8E-03	3.9E-04	3.9E-04	4.3E+01	2.4E+00	2.4E-01	2.4E-01	--	--	--	--	--	--	--	--	**4.3E+01**	**2.4E+00**	**2.4E-01**	**2.4E-01**
Hexachlorobenzene[C]	0	--	--	2.8E-03	2.9E-03	--	--	1.8E+00	1.8E+00	--	--	--	--	--	--	--	--	**--**	**--**	**1.8E+00**	**1.8E+00**
Hexachlorobutadiene[C]	0	--	--	4.4E+00	1.8E+02	--	--	2.8E+03	1.1E+05	--	--	--	--	--	--	--	--	**--**	**--**	**2.8E+03**	**1.1E+05**
Hexachlorocyclohexane Alpha-BHC[C]	0	--	--	2.6E-02	4.9E-02	--	--	1.6E+01	3.1E+01	--	--	--	--	--	--	--	--	**--**	**--**	**1.6E+01**	**3.1E+01**
Hexachlorocyclohexane Beta-BHC[C]	0	--	--	9.1E-02	1.7E-01	--	--	5.7E+01	1.1E+02	--	--	--	--	--	--	--	--	**--**	**--**	**5.7E+01**	**1.1E+02**
Hexachlorocyclohexane Gamma-BHC[C] (Lindane)	0	9.5E-01	--	9.8E-01	1.8E+00	7.9E+01	--	6.1E+02	1.1E+03	--	--	--	--	--	--	--	--	**7.9E+01**	**--**	**6.1E+02**	**1.1E+03**
Hexachlorocyclopentadiene	0	--	--	4.0E+01	1.1E+03	--	--	2.5E+04	6.9E+05	--	--	--	--	--	--	--	--	**--**	**--**	**2.5E+04**	**6.9E+05**
Hexachloroethane[C]	0	--	--	1.4E+01	3.3E+01	--	--	8.8E+03	2.1E+04	--	--	--	--	--	--	--	--	**--**	**--**	**8.8E+03**	**2.1E+04**
Hydrogen Sulfide	0	--	2.0E+00	--	--	--	1.3E+03	--	--	--	--	--	--	--	--	--	--	**--**	**1.3E+03**	**--**	**--**
Indeno (1,2,3-cd) pyrene [C]	0	--	--	3.8E-02	1.8E-01	--	--	2.4E+01	1.1E+02	--	--	--	--	--	--	--	--	**--**	**--**	**2.4E+01**	**1.1E+02**
Iron	0	--	--	3.0E+02	--	--	--	1.9E+05	--	--	--	--	--	--	--	--	--	**--**	**--**	**1.9E+05**	**--**
Isophorone[C]	0	--	--	3.5E+02	9.6E+03	--	--	2.2E+05	6.0E+06	--	--	--	--	--	--	--	--	**--**	**--**	**2.2E+05**	**6.0E+06**
Kepone	0	--	0.0E+00	--	--	--	0.0E+00	--	--	--	--	--	--	--	--	--	--	**--**	**0.0E+00**	**--**	**--**
Lead	0	7.1E+01	8.1E+00	1.5E+01	--	5.9E+03	5.0E+03	9.4E+03	--	--	--	--	--	--	--	--	--	**5.9E+03**	**5.0E+03**	**9.4E+03**	**--**
Malathion	0	--	1.0E-01	--	--	--	6.3E+01	--	--	--	--	--	--	--	--	--	--	**--**	**6.3E+01**	**--**	**--**
Manganese	0	--	--	5.0E+01	--	--	--	3.1E+04	--	--	--	--	--	--	--	--	--	**--**	**--**	**3.1E+04**	**--**
Mercury	0	1.4E+00	7.7E-01	- -	- -	1.2E+02	4.8E+02	- -	- -	--	--	--	--	--	--	--	--	**1.2E+02**	**4.8E+02**	**- -**	**- -**
Methyl Bromide	0	--	--	4.7E+01	1.5E+03	--	--	2.9E+04	9.4E+05	--	--	--	--	--	--	--	--	**--**	**--**	**2.9E+04**	**9.4E+05**
Methylene Chloride [C]	0	--	--	4.6E+01	5.9E+03	--	--	2.9E+04	3.7E+06	--	--	--	--	--	--	--	--	**--**	**--**	**2.9E+04**	**3.7E+06**
Methoxychlor	0	--	3.0E-02	1.0E+02	--	--	1.9E+01	6.3E+04	--	--	--	--	--	--	--	--	--	**--**	**1.9E+01**	**6.3E+04**	**--**
Mirex	0	--	0.0E+00	--	--	--	0.0E+00	--	--	--	--	--	--	--	--	--	--	**--**	**0.0E+00**	**--**	**--**
Nickel	0	1.3E+02	1.4E+01	6.1E+02	4.6E+03	1.1E+04	9.0E+03	3.8E+05	2.9E+06	--	--	--	--	--	--	--	--	**1.1E+04**	**9.0E+03**	**3.8E+05**	**2.9E+06**
Nitrate (as N)	0	--	--	1.0E+04	--	--	--	6.3E+06	--	--	--	--	--	--	--	--	--	**--**	**--**	**6.3E+06**	**--**
Nitrobenzene	0	--	--	1.7E+01	6.9E+02	--	--	1.1E+04	4.3E+05	--	--	--	--	--	--	--	--	**--**	**--**	**1.1E+04**	**4.3E+05**
N-Nitrosodimethylamine[C]	0	--	--	6.9E-03	3.0E+01	--	--	4.3E+00	1.9E+04	--	--	--	--	--	--	--	--	**--**	**--**	**4.3E+00**	**1.9E+04**
N-Nitrosodiphenylamine[C]	0	--	--	3.3E+01	6.0E+01	--	--	2.1E+04	3.8E+04	--	--	--	--	--	--	--	--	**--**	**--**	**2.1E+04**	**3.8E+04**
N-Nitrosodi-n-propylamine[C]	0	--	--	5.0E-02	5.1E+00	--	--	3.1E+01	3.2E+03	--	--	--	--	--	--	--	--	**--**	**--**	**3.1E+01**	**3.2E+03**
Nonylphenol	0	2.8E+01	6.6E+00	--	--	2.3E+03	4.1E+03	--	--	--	--	--	--	--	--	--	--	**2.3E+03**	**4.1E+03**	**--**	**--**
Parathion	0	6.5E-02	1.3E-02	--	--	5.4E+00	8.1E+00	--	--	--	--	--	--	--	--	--	--	**5.4E+00**	**8.1E+00**	**--**	**--**
PCB Total[C]	0	--	1.4E-02	6.4E-04	6.4E-04	--	8.8E+00	4.0E-01	4.0E-01	--	--	--	--	--	--	--	--	**--**	**8.8E+00**	**4.0E-01**	**4.0E-01**
Pentachlorophenol [C]	0	9.7E+00	7.4E+00	2.7E+00	3.0E+01	8.1E+02	4.6E+03	1.7E+03	1.9E+04	--	--	--	--	--	--	--	--	**8.1E+02**	**4.6E+03**	**1.7E+03**	**1.9E+04**
Phenol	0	--	--	1.0E+04	8.6E+05	--	--	6.3E+06	5.4E+08	--	--	--	--	--	--	--	--	**--**	**--**	**6.3E+06**	**5.4E+08**
Pyrene	0	--	--	8.3E+02	4.0E+03	--	--	5.2E+05	2.5E+06	--	--	--	--	--	--	--	--	**--**	**--**	**5.2E+05**	**2.5E+06**
Radionuclides	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**--**	**--**	**--**	**--**
Gross Alpha Activity (pCi/L)	0	--	--	1.5E+01	--	--	--	9.4E+03	--	--	--	--	--	--	--	--	--	**--**	**--**	**9.4E+03**	**--**
Beta and Photon Activity (mrem/yr)	0	--	--	4.0E+00	4.0E+00	--	--	2.5E+03	2.5E+03	--	--	--	--	--	--	--	--	**--**	**--**	**2.5E+03**	**2.5E+03**
Radium 226 + 228 (pCi/L)	0	--	--	5.0E+00	--	--	--	3.1E+03	--	--	--	--	--	--	--	--	--	**--**	**--**	**3.1E+03**	**--**
Uranium (ug/l)	0	--	--	3.0E+01	--	--	--	1.9E+04	--	--	--	--	--	--	--	--	--	**--**	**--**	**1.9E+04**	**--**
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	1.7E+02	4.2E+03	1.7E+03	3.1E+03	1.1E+05	2.6E+06	--	--	--	--	--	--	--	--	**1.7E+03**	**3.1E+03**	**1.1E+05**	**2.6E+06**
Silver	0	1.7E+00	--	--	--	1.4E+02	--	--	--	--	--	--	--	--	--	--	--	**1.4E+02**	**--**	**--**	**--**
Sulfate	0	--	--	2.5E+05	--	--	--	1.6E+08	--	--	--	--	--	--	--	--	--	**--**	**--**	**1.6E+08**	**--**
1,1,2,2-Tetrachloroethane[C]	0	--	--	1.7E+00	4.0E+01	--	--	1.1E+03	2.5E+04	--	--	--	--	--	--	--	--	**--**	**--**	**1.1E+03**	**2.5E+04**
Tetrachloroethylene[C]	0	--	--	6.9E+00	3.3E+01	--	--	4.3E+03	2.1E+04	--	--	--	--	--	--	--	--	**--**	**--**	**4.3E+03**	**2.1E+04**
Thallium	0	--	--	2.4E-01	4.7E-01	--	--	1.5E+02	2.9E+02	--	--	--	--	--	--	--	--	**--**	**--**	**1.5E+02**	**2.9E+02**
Toluene	0	--	--	5.1E+02	6.0E+03	--	--	3.2E+05	3.8E+06	--	--	--	--	--	--	--	--	**--**	**--**	**3.2E+05**	**3.8E+06**
Total dissolved solids	0	--	--	5.0E+05	--	--	--	3.1E+08	--	--	--	--	--	--	--	--	--	**--**	**--**	**3.1E+08**	**--**
Toxaphene [C]	0	7.3E-01	2.0E-04	2.8E-03	2.8E-03	6.1E+01	1.3E-01	1.8E+00	1.8E+00	--	--	--	--	--	--	--	--	**6.1E+01**	**1.3E-01**	**1.8E+00**	**1.8E+00**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Tributyltin	0	4.6E-01	7.2E-02	--	--	3.8E+01	4.5E+01	--	--	--	--	--	--	--	--	--	--	**3.8E+01**	**4.5E+01**	**--**	**--**
1,2,4-Trichlorobenzene	0	--	--	3.5E+01	7.0E+01	--	--	2.2E+04	4.4E+04	--	--	--	--	--	--	--	--	**--**	**--**	**2.2E+04**	**4.4E+04**
1,1,2-Trichloroethane[C]	0	--	--	5.9E+00	1.6E+02	--	--	3.7E+03	1.0E+05	--	--	--	--	--	--	--	--	**--**	**--**	**3.7E+03**	**1.0E+05**
Trichloroethylene [C]	0	--	--	2.5E+01	3.0E+02	--	--	1.6E+04	1.9E+05	--	--	--	--	--	--	--	--	**--**	**--**	**1.6E+04**	**1.9E+05**
2,4,6-Trichlorophenol [C]	0	--	--	1.4E+01	2.4E+01	--	--	8.8E+03	1.5E+04	--	--	--	--	--	--	--	--	**--**	**--**	**8.8E+03**	**1.5E+04**
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	5.0E+01	--	--	--	3.1E+04	--	--	--	--	--	--	--	--	--	**--**	**--**	**3.1E+04**	**--**
Vinyl Chloride[C]	0	--	--	2.5E-01	2.4E+01	--	--	1.6E+02	1.5E+04	--	--	--	--	--	--	--	--	**--**	**--**	**1.6E+02**	**1.5E+04**
Zinc	0	8.3E+01	8.4E+01	7.4E+03	2.6E+04	6.9E+03	5.2E+04	4.6E+06	1.6E+07	--	--	--	--	--	--	--	--	**6.9E+03**	**5.2E+04**	**4.6E+06**	**1.6E+07**

Notes:

1. All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
2. Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals
3. Metals measured as Dissolved, unless specified otherwise
4. "C" indicates a carcinogenic parameter
5. Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.
   Antidegradation WLAs are based upon a complete mix.
6. Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic
   = (0.1(WQC - background conc.) + background conc.) for human health
7. WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	3.5E+03
Arsenic	6.3E+03
Barium	1.3E+06
Cadmium	8.3E+01
Chromium III	1.4E+04
Chromium VI	5.3E+02
Copper	3.1E+02
Iron	1.9E+05
Lead	2.4E+03
Manganese	3.1E+04
Mercury	4.7E+01
Nickel	4.3E+03
Selenium	6.7E+02
Silver	5.8E+01
Zinc	2.8E+03

Note: do not use QL's lower than the minimum QL's provided in agency guidance

STATS.EXE ANALYSES-001

12/6/2010 4:40:46 PM

Facility = DuPont Teijin-001
Chemical = Ammonia
Chronic averaging period = 30
WLAa = 694 mg/L
WLAc = 539 mg/L
Q.L. = 0.2 mg/L
# samples/mo. = 4
# samples/wk. = 1

Summary of Statistics:

observations = 2
Expected Value = 3.125 mg/:
Variance = 3.51562
C.V. = 0.6
97th percentile daily values = 7.60442 mg/L
97th percentile 4 day average = 5.19934 mg/L
97th percentile 30 day average= 3.76891 mg/L
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No limit is needed for this material

The data are:

1.00 mg/L
5.25 mg/L

12/6/2010 5:35:13 PM

Facility = DuPont Teijin - 001
Chemical = Cadmium
Chronic averaging period = 4
WLAa = 210 ug/L
WLAc = 520 ug/L
Q.L. = 1 ug/L
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 1 ug/L
Variance = .36
C.V. = 0.6
97th percentile daily values = 2.43341 ug/L
97th percentile 4 day average = 1.66379 ug/L
97th percentile 30 day average= 1.20605 ug/L
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

1.0 ug/L

12/6/2010 5:17:44 PM

Facility = DuPont Teijin - 001
Chemical = Chlorides
Chronic averaging period = 4
WLAa = 72000000 ug/L
WLAc = 140000000 ug/L
Q.L. = 1
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 153000 ug/L
Variance = 8427240
C.V. = 0.6
97th percentile daily values = 372312 ug/L
97th percentile 4 day average = 254559 ug/L
97th percentile 30 day average= 184526 ug/L
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

153000 ug/L

2/1/2011 2:52:34 PM

Facility = DuPont Teijin - Outfall 001
Chemical = Chromium VI
Chronic averaging period = 4
WLAa = 1300 ug/L
WLAc = 6900 ug/L
Q.L. = 1 ug/L
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 3 ug/L
Variance = 3.24
C.V. = 0.6
97th percentile daily values = 7.30025 ug/L
97th percentile 4 day average = 4.99137 ug/L
97th percentile 30 day average= 3.61815 ug/L
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

3 ug/L

A value of <3 ug/L was reported in the application. However, a maximum quantification level of 1.6 ug/L was specified in the application. Because the permittee did not meet the required QL, the less than value was evaluated as if the pollutant were observed at the QL concentration. This evaluation indicates that there is no reasonable potential and that a limitation is not needed at this time.

12/6/2010 5:19:22 PM

Facility = DuPont Teijin - 001
Chemical = Hydrogen sulfide
Chronic averaging period = 4
WLAa = N/A
WLAc = 1300 ug/L
Q.L. = 1
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 12 ug/L
Variance = 51.84
C.V. = 0.6
97th percentile daily values = 29.2010 ug/L
97th percentile 4 day average = 19.9654 ug/L
97th percentile 30 day average= 14.4726 ug/L
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

12 ug/L

12/6/2010 5:10:50 PM

Facility = DuPont Teijin - 001
Chemical = Lead, dissolved
Chronic averaging period = 4
WLAa = 5900 ug/L
WLAc = 5000 ug/L
Q.L. = 1 ug/L
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 1.2 ug/L
Variance = .5184
C.V. = 0.6
97th percentile daily values = 2.92010 ug/L
97th percentile 4 day average = 1.99654 ug/L
97th percentile 30 day average= 1.44726 ug/L
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

1.2 ug/L

12/6/2010 5:12:21 PM

Facility = DuPont Teijin - 001
Chemical = Nickel, dissolved
Chronic averaging period = 4
WLAa = 11000 ug/L
WLAc = 9000 ug/L
Q.L. = 1 ug/L
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 8 ug/L
Variance = 23.04
C.V. = 0.6
97th percentile daily values = 19.4673 ug/L
97th percentile 4 day average = 13.3103 ug/L
97th percentile 30 day average= 9.64842 ug/L
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

8 ug/L

12/6/2010 5:15:03 PM

Facility = DuPont Teijin - 001
Chemical = Selenium, Total
Chronic averaging period = 4
WLAa = 1700 ug/L
WLAc = 3100 ug/L
Q.L. = 1 ug/L
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 1.6 ug/L
Variance = .9216
C.V. = 0.6
97th percentile daily values = 3.89346 ug/L
97th percentile 4 day average = 2.66206 ug/L
97th percentile 30 day average= 1.92968 ug/L
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

1.6 ug/L

12/6/2010 4:53:44 PM

Facility = DuPont Teijin-001
Chemical = TRC
Chronic averaging period = 4
WLAa = 1600 ug/L
WLAc = 6900 ug/L
Q.L. = 100 ug/L
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 300 ug/L
Variance = 32400
C.V. = 0.6
97th percentile daily values = 730.025 ug/L
97th percentile 4 day average = 499.137 ug/L
97th percentile 30 day average= 361.815 ug/L
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

300 ug/L

12/6/2010 5:22:05 PM

Facility = DuPont Teijin - 001
Chemical = Tributyltin
Chronic averaging period = 4
WLAa = 38 ug/L
WLAc = 45 ug/L
Q.L. = 0.1
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = .3 ug/L
Variance = .0324
C.V. = 0.6
97th percentile daily values = .730025 ug/L
97th percentile 4 day average = .499137 ug/L
97th percentile 30 day average= .361815 ug/L
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

0.3 ug/L

12/6/2010 5:16:14 PM

Facility = DuPont Teijin - 001
Chemical = Zinc, dissolved
Chronic averaging period = 4
WLAa = 6900 ug/L
WLAc = 52000 ug/L
Q.L. = 1 ug/L
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 1960
Variance = 1382976
C.V. = 0.6
97th percentile daily values = 4769.49 ug/L
97th percentile 4 day average = 3261.02 ug/L
97th percentile 30 day average= 2363.86 ug/L
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

1960 ug/L

PROPOSED GROUNDWATER DATA EVALUATION

ANALYTE	CASNO	UNITS	MaxConcentration	MaxDate	HH (PWS) Std	HH Std	Reasonable Potential
1,1,1,2-TETRACHLOROETHANE	630206	MG/L					
1,1,1-TRICHLOROETHANE	71556	MG/L	0.00096	4/29/2005			N/A
1,1,2,2-TETRACHLOROETHANE	79345	MG/L					
1,1,2-TRICHLOROETHANE	79005	MG/L	0.0001	4/29/2008	3.7	100	NO
1,1-DICHLOROETHANE	75343	MG/L	0.0094	6/28/2010			N/A
1,1-DICHLOROETHENE	75354	MG/L	0.02	4/23/2008	210	4,400	NO
1,2,3-TRICHLOROPROPANE	96184	MG/L					
1,2-DIBROMO-3-CHLOROPROPANE	96128	MG/L					
1,2-DIBROMOETHANE (EDB)	106934	MG/L					
1,2-DICHLOROBENZENE	95501	MG/L					
1,2-DICHLOROETHANE	107062	MG/L	0.0003	6/28/2010	2.4	230	NO
1,2-DICHLOROPROPANE	78875	MG/L					
1,3-DICHLOROBENZENE	541731	MG/L					
1,4-DICHLOROBENZENE	106467	MG/L					
2-HEXANONE	591786	MG/L					
4-ISOPROPYLTOLUENE	99876	MG/L					
ACETALDEHYDE	75070	MG/L	0.058	6/28/2010			N/A
ACETONE	67641	MG/L	0.77	6/28/2010			N/A
ACETONITRILE	75058	MG/L					
ACROLEIN	107028	MG/L					
ACRYLONITRILE	107131	MG/L					
ALLYL CHLORIDE	107051	MG/L					
BENZENE	71432	MG/L	0.0003	5/1/2008	14	320	NO
BROMODICHLOROMETHANE	75274	MG/L	0.0058	6/28/2010	3.4	110	NO
BROMOFORM	75252	MG/L					
CARBON DISULFIDE	75150	MG/L	0.0007	4/29/2008			N/A
CARBON TETRACHLORIDE	56235	MG/L					
CHLOROBENZENE	108907	MG/L	0.0024	5/1/2008	81	1,000	NO
CHLORODIBROMOMETHANE	124481	MG/L	0.0011	6/28/2010	2.5	81	NO
CHLOROFORM	67663	MG/L	0.021	6/28/2010	210	6,900	NO
CHLOROPRENE	126998	MG/L					
CIS-1,2 DICHLOROETHENE	156592	MG/L	0.071	4/23/2008			N/A
CIS-1,3-DICHLOROPROPENE	10061015	MG/L					
DICHLORODIFLUOROMETHANE	75718	MG/L					
ETHYL CHLORIDE	75003	MG/L	0.0006	4/29/2008			N/A
ETHYL METHACRYLATE	97632	MG/L					
ETHYLBENZENE	100414	MG/L	0.0002	5/1/2008	330	1,300	NO
ETHYLENE GLYCOL	107211	MG/L	26	4/24/2008			N/A
IODOMETHANE	74884	MG/L	0.0002	4/29/2008			N/A
ISOBUTYL ALCOHOL	78831	MG/L					
META- AND PARA-XYLENE	EVS0253	MG/L	0.0001	6/27/2010			N/A
METHACRYLONITRILE	126987	MG/L					
METHYL BROMIDE	74839	MG/L					
METHYL CHLORIDE	74873	MG/L	0.0003	4/29/2008			N/A
METHYL ETHYL KETONE	78933	MG/L	0.52	6/28/2010			N/A
METHYL ISOBUTYL KETONE	108101	MG/L					
METHYL METHACRYLATE	80626	MG/L					
METHYL TERTIARY BUTYL ETHER	1634044	MG/L	0.00014	4/28/2005			N/A
METHYLENE BROMIDE	74953	MG/L					
METHYLENE CHLORIDE	75092	MG/L	0.0009	6/26/2010	29	3,700	NO
ORTHO-XYLENE	95476	MG/L					
PENTACHLOROETHANE	76017	MG/L					
PROPIONITRILE	107120	MG/L					
STYRENE	100425	MG/L					
TETRACHLOROETHYLENE	127184	MG/L	0.11	4/29/2005	4.3	21	NO
TOLUENE	108883	MG/L	0.0051	5/1/2008	320	3,800	NO
TRANS-1,2-DICHLOROETHENE	156605	MG/L	0.0006	6/28/2010	88	6300	NO
TRANS-1,3-DICHLOROPROPENE	10061026	MG/L					
TRANS-1,4-DICHLOROBUTENE-2	110576	MG/L					
TRICHLOROETHENE	79016	MG/L	0.008	4/29/2008	16	190	NO
TRICHLOROFLUOROMETHANE	75694	MG/L	0.0009	5/4/2010			N/A
VINYL ACETATE	108054	MG/L					
VINYL CHLORIDE	75014	MG/L	0.001	4/29/2008	0.16	15	NO
XYLENES	1330207	MG/L	0.000069	4/26/2005			N/A
1,1'-OXYBISBENZENE	101848	MG/L	9	5/1/2008			N/A

ANALYTE	CASNO	UNITS	MaxConcentration	MaxDate	HH (PWS) Std	HH Std	Reasonable Potential
1,2,4,5-TETRACHLOROBENZENE	95943	MG/L					
1,2,4-TRICHLOROBENZENE	120821	MG/L					
1,3,5-TRINITROBENZENE	99354	MG/L					
1,3-DINITROBENZENE	99650	MG/L	0.006	6/28/2010			N/A
1,4-DIOXANE	123911	MG/L	0.089	4/30/2008			N/A
1,4-NAPHTHOQUINONE	130154	MG/L					
1-NAPHTHYLAMINE	134327	MG/L					
2,3,4,6-TETRACHLOROPHENOL	58902	MG/L					
2,4,5-TRICHLOROPHENOL	95954	MG/L					
2,4,6-TRICHLOROPHENOL	88062	MG/L					
2,4-DICHLOROPHENOL	120832	MG/L					
2,4-DIMETHYLPHENOL	105679	MG/L					
2,4-DINITROPHENOL	51285	MG/L					
2,4-DINITROTOLUENE	121142	MG/L					
2,6-DICHLOROPHENOL	87650	MG/L					
2,6-DINITROTOLUENE	606202	MG/L					
2-ACETYLAMINOFLUORENE	53963	MG/L					
2-CHLOROPHENOL	95578	MG/L					
2-METHYLNAPHTHALENE	91576	MG/L	0.001	5/1/2008			N/A
2-METHYLPHENOL (O-CRESOL)	95487	MG/L					
2-NAPHTHYLAMINE	91598	MG/L					
2-NITROANILINE	88744	MG/L					
2-NITROPHENOL	88755	MG/L	0.002	4/30/2008			N/A
2-PICOLINE	109068	MG/L					
3,3'-DICHLOROBENZIDINE	91941	MG/L					
3,3'-DIMETHYLBENZIDINE	119937	MG/L					
3-METHYLCHOLANTHRENE	56495	MG/L					
3-NITROANILINE	99092	MG/L					
4,6-DINITRO-2-METHYLPHENOL	534521	MG/L					
4-AMINOBIPHENYL	92671	MG/L					
4-BROMOPHENYL PHENYL ETHER	101553	MG/L					
4-CHLORO-3-METHYLPHENOL	59507	MG/L					
4-CHLOROANILINE	106478	MG/L					
4-CHLOROPHENYL PHENYL ETHER	7005723	MG/L					
4-DIMETHYLAMINOAZOBENZENE	60117	MG/L					
4-METHYLPHENOL (P-CRESOL)	106445	MG/L					
4-NITROANILINE	100016	MG/L					
4-NITROPHENOL	100027	MG/L					
4-NITROQUINOLINE-N-OXIDE	56575	MG/L					
5-NITRO-ORTHO-TOLUIDINE	99558	MG/L					
7,12-DIMETHYLBENZ[A]ANTHRACENE	57976	MG/L					
ACENAPHTHENE	83329	MG/L	0.00002	6/22/2010	420	620	NO
ACENAPHTHYLENE	208968	MG/L	0.000013	6/27/2010			N/A
ACETOPHENONE	98862	MG/L					
ANILINE	62533	MG/L					
ANTHRACENE	120127	MG/L	0.000018	6/22/2010	5200	25000	NO
BENZO(A)ANTHRACENE	56553	MG/L	0.000021	6/22/2010	0.024	0.11	NO
BENZO(B)FLUORANTHENE	205992	MG/L	0.00002	6/22/2010	0.024	0.11	NO
BENZO(G,H,I)PERYLENE	191242	MG/L	0.000015	6/28/2010			N/A
BENZO(K)FLUORANTHENE	207089	MG/L	0.000023	6/22/2010	0.024	0.11	NO
BENZO[A]PYRENE	50328	MG/L	0.00002	6/22/2010	0.024	0.11	NO
BENZYL ALCOHOL	100516	MG/L					
BIPHENYL	92524	MG/L	2.9	5/1/2008			N/A
BIS(2-CHLOROETHOXY)METHANE	111911	MG/L					
BIS(2-CHLOROETHYL)ETHER	111444	MG/L					
BIS(2-ETHYLHEXYL)PHTHALATE	117817	MG/L	0.003	6/27/2010	7.5	14	NO
BUTYL BENZYL PHTHALATE	85687	MG/L					
CHLOROBENZILATE	510156	MG/L					
CHRYSENE	218019	MG/L	0.00002	6/22/2010	0.0024	0.011	NO
DIALLATE	2303164	MG/L	0.002	4/30/2008			N/A
DIBENZ(A,H)ANTHRACENE	53703	MG/L	0.000014	6/22/2010	0.0024	0.011	NO
DIBENZOFURAN	132649	MG/L	0.005	5/1/2008			N/A
DIETHYL PHTHALATE	84662	MG/L					
DIETHYLENE GLYCOL	111466	MG/L	17	4/24/2008			N/A
DIMETHYL PHTHALATE	131113	MG/L					
DI-N-BUTYL PHTHALATE	84742	MG/L	0.004	5/4/2010	1300	2800	NO
ETHYL METHANESULFONATE	62500	MG/L					

ANALYTE	CASNO	UNITS	MaxConcentration	MaxDate	HH (PWS) Std	HH Std	Reasonable Potential
FLUORANTHENE	206440	MG/L	0.000031	6/27/2010	81	88	NO
FLUORENE	86737	MG/L	0.000041	6/27/2010	690	3300	NO
HEXACHLOROBENZENE	118741	MG/L					
HEXACHLOROBUTADIENE	87683	MG/L					
HEXACHLOROCYCLOPENTADIENE	77474	MG/L					
HEXACHLOROETHANE	67721	MG/L					
HEXACHLOROPROPYLENE	1888717	MG/L					
INDENO (1,2,3-CD) PYRENE	193395	MG/L	0.000014	6/22/2010	0.0024	0.011	NO
ISODRIN	465736	MG/L					N/A
ISOPHORONE	78591	MG/L					
ISOSAFROLE	120581	MG/L					
METHAPYRILENE	91805	MG/L					
METHYL METHANESULFONATE	66273	MG/L					
NAPHTHALENE	91203	MG/L	0.011	5/1/2008			N/A
N-DIOCTYL PHTHALATE	117840	MG/L					
NITROBENZENE	98953	MG/L					
N-NITROSO(METHYL)ETHYLAMINE	10595956	MG/L					
N-NITROSODIETHYLAMINE	55185	MG/L					
N-NITROSODIMETHYLAMINE	62759	MG/L					
N-NITROSO-DI-N-BUTYLAMINE	924163	MG/L					
N-NITROSODI-N-PROPYLAMINE	621647	MG/L					
N-NITROSODIPHENYLAMINE	86306	MG/L					
N-NITROSOMORPHOLINE	59892	MG/L					
N-NITROSOPIPERIDINE	100754	MG/L					
N-NITROSOPYRROLIDINE	930552	MG/L					
O,O,O-TRIETHYLPHOSPHOROTHIOATE	126681	MG/L					
O-TOLUIDINE	95534	MG/L					
PARA-PHENYLENEDIAMINE	106503	MG/L					
PCN-2	91587	MG/L					
PENTACHLOROBENZENE	608935	MG/L					
PENTACHLORONITROBENZENE	82688	MG/L					
PENTACHLOROPHENOL	87865	MG/L					
PHENACETIN	62442	MG/L					
PHENANTHRENE	85018	MG/L	0.000023	6/22/2010			N/A
PHENOL	108952	MG/L	2.5	4/27/2005	6300	540000	NO
PROPYLENE GLYCOL	57556	MG/L	12.1	5/4/2010			N/A
PYRENE	129000	MG/L	0.000023	6/27/2010	520	2500	NO
PYRIDINE	110861	MG/L					
SAFROLE	94597	MG/L					
TETRAETHYL DITHIOPYROPHOSPHATE	3689245	MG/L					
THIONAZIN	297972	MG/L					
TRIETHYLENE GLYCOL	112276	MG/L	12	4/24/2008			N/A
PRONAMIDE	23950585	MG/L					
DIMETHOATE	60515	MG/L					
ANTIMONY	7440360	MG/L	0.0314	6/27/2010	3.5	400	NO
ANTIMONY	7440360	MG/L	0.0352	6/27/2010	3.5	400	NO
ARSENIC	7440382	MG/L	0.0094	6/25/2010	6.3	NA	NO
ARSENIC	7440382	MG/L	0.023	5/4/2010	6.3	NA	NO
BARIUM	7440393	MG/L	0.0421	6/28/2010	1300	NA	NO
BARIUM	7440393	MG/L	0.605	5/4/2010	1300	NA	NO
BERYLLIUM	7440417	MG/L					
BERYLLIUM	7440417	MG/L	0.0049	5/4/2010			N/A
CADMIUM	7440439	MG/L	0.0172	6/26/2010	3.1	NA	NO
CADMIUM	7440439	MG/L	0.0212	4/30/2008	3.1	NA	NO
CHROMIUM	7440473	MG/L	0.0049	6/26/2010	6300	NA	NO
CHROMIUM	7440473	MG/L	0.158	5/4/2010	6300	NA	NO
COBALT	7440484	MG/L	0.0539	6/26/2010			N/A
COBALT	7440484	MG/L	0.171	4/30/2008			N/A
COPPER	7440508	MG/L	0.0592	6/28/2010	810	NA	NO
COPPER	7440508	MG/L	0.0045	4/30/2008	810	NA	NO
LEAD	7439921	MG/L	0.00068	6/28/2010	9.4	NA	NO
LEAD	7439921	MG/L	0.00068	6/28/2010	9.4	NA	NO
MERCURY	7439976	MG/L	0.000082	6/23/2010	NA	NA	NO
MERCURY	7439976	MG/L	0.00011	6/24/2010	NA	NA	NO
NICKEL	7440020	MG/L	0.0303	6/26/2010	380	2900	NO
NICKEL	7440020	MG/L	0.163	4/29/2008	380	2900	NO
SELENIUM	7782492	MG/L					

ANALYTE	CASNO	UNITS	MaxConcentration	MaxDate	HH (PWS) Std	HH Std	Reasonable Potential
SELENIUM	7782492	MG/L					
SILVER	7440224	MG/L					
SILVER	7440224	MG/L	0.0527	4/29/2008	NA	NA	NO
THALLIUM	7440280	MG/L					
THALLIUM	7440280	MG/L	0.00047	5/4/2010	0.15	0.29	NO
TIN	7440315	MG/L					
TIN	7440315	MG/L					
VANADIUM	7440622	MG/L					
VANADIUM	7440622	MG/L	0.154	5/4/2010			N/A
ZINC	7440666	MG/L	0.541	6/26/2010	4600	16000	NO
ZINC	7440666	MG/L	0.621	4/30/2008	4600	16000	NO
TOTAL ORGANIC CARBON	C012	MG/L	9.08	4/28/2005			N/A
DEPTH TO WATER FROM TOC	EVS0122	Feet	35.82	4/24/2008			N/A
DISSOLVED OXYGEN (FIELD)	EVS0123	MG/L	11.12	4/23/2008			N/A
OVABZONE	OVABZONE	PPM	0	5/1/2008			N/A
OVACASING	OVACASING	PPM	0	5/1/2008			N/A
PH (FIELD)	EVS0127	STD UNITS	9.24	4/22/2008			N/A
REDOX (FIELD)	EVS0128	MV	416	4/23/2008			N/A
SPECIFIC CONDUCTANCE (FIELD)	EVS0044	UMHOS/CM	146000	4/23/2008			N/A
TEMPERATURE (FIELD)	EVS0113	DEGREES C	22.09	4/23/2008			N/A
TOTAL WELL DEPTH	EVS0998	Feet	103.38	4/24/2008			N/A
TURBIDITY QUANTITATIVE (FIELD)	EVS0130	NTU	750	4/29/2008			N/A
BIS(2-CHLOROISOPROPYL)ETHER	39638329	MG/L					

Yellow: There are no WQS for the parameter

Blue: Human Health Standards apply to the parameter

Orange: Aquatic Standards apply to the parameter (Human Health Standardards may also apply). Refer to GW Stats Anaylses for aquatic reasonable potential evaluation.

GROUNDWATER STATS.EXE
ANALYSES

1/5/2011 8:19:13 AM

Facility = DuPont Teijin GW
Chemical = Arsenic
Chronic averaging period = 4
WLAa = 28000 ug/L
WLAc = 94000 ug/L
Q.L. = 1 ug/L
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 2
Expected Value = 16.2 ug/L
Variance = 94.4784
C.V. = 0.6
97th percentile daily values = 39.4213 ug/L
97th percentile 4 day average = 26.9534 ug/L
97th percentile 30 day average= 19.5380 ug/L
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

9.4 ug/L
23 ug/L

1/5/2011 1:49:55 PM

Facility = DuPont Teijin GW
Chemical = Chromium
Chronic averaging period = 4
WLAa = 1300 ug/L
WLAc = 6900 ug/L
Q.L. = 1 ug/L
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 2
Expected Value = 81.45 ug/L
Variance = 2388.27
C.V. = 0.6
97th percentile daily values = 198.201 ug/L
97th percentile 4 day average = 135.515 ug/L
97th percentile 30 day average= 98.2330 ug/L
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

4.9 ug/L
158 ug/L

The total chromium observed data were compared with Chromium VI aquatic WLAs, which are more stringent than the Chromium III WLAs. Total Chromium does not have aquatic standards.

1/5/2011 1:51:45 PM

Facility = DuPont Teijin GW
Chemical = Copper
Chronic averaging period = 4
WLAa = 770 ug/L
WLAc = 4000 ug/L
Q.L. = 1 ug/L
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 2
Expected Value = 31.85 ug/L
Variance = 365.192
C.V. = 0.6
97th percentile daily values = 77.5043 ug/L
97th percentile 4 day average = 52.9917 ug/L
97th percentile 30 day average= 38.4127 ug/L
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

59.2 ug/L
4.5 ug/L

1/5/2011 1:54:06 PM

Facility = DuPont-Teijin- GW
Chemical = Lead
Chronic averaging period = 4
WLAa = 5900 ug/L
WLAc = 5000 ug/L
Q.L. = 0.5 ug/L
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 2
Expected Value = .68 ug/L
Variance = .166464
C.V. = 0.6
97th percentile daily values = 1.65472 ug/L
97th percentile 4 day average = 1.13137 ug/L
97th percentile 30 day average= .820116 ug/L
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

0.68 ug/L
0.68 ug/L

1/5/2011 1:55:40 PM

Facility = DuPont-Teijin- GW
Chemical = Mercury
Chronic averaging period = 4
WLAa = 120 ug/L
WLAc = 480 ug/L
Q.L. = 0.01
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 2
Expected Value = .096 ug/L
Variance = .003317
C.V. = 0.6
97th percentile daily values = .233608 ug/L
97th percentile 4 day average = .159723 ug/L
97th percentile 30 day average= .115781 ug/L
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

0.082 ug/L
0.11 ug/L

1/5/2011 1:57:01 PM

Facility = DuPont-Teijin- GW
Chemical = Nickel
Chronic averaging period = 4
WLAa = 11000 ug/L
WLAc = 9000 ug/L
Q.L. = 1 ug/L
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 2
Expected Value = 96.65 ug/L
Variance = 3362.84
C.V. = 0.6
97th percentile daily values = 235.189 ug/L
97th percentile 4 day average = 160.805 ug/L
97th percentile 30 day average= 116.565 ug/L
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

30.3 ug/L
163 ug/L

1/5/2011 1:57:57 PM

Facility = DuPont-Teijin- GW
Chemical = silver
Chronic averaging period = 4
WLAa = 140 ug/L
WLAc = N/A
Q.L. = 1 ug/L
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 52.7 ug/L
Variance = 999.824
C.V. = 0.6
97th percentile daily values = 128.241 ug/L
97th percentile 4 day average = 87.6817 ug/L
97th percentile 30 day average= 63.5590 ug/L
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

52.7 ug/L

1/5/2011 1:59:01 PM

Facility = DuPont-Teijin- GW
Chemical = zinc
Chronic averaging period = 4
WLAa = 6900 ug/L
WLAc = 52000 ug/L
Q.L. = 1 ug/L
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 2
Expected Value = 581 ug/L
Variance = 121521.
C.V. = 0.6
97th percentile daily values = 1413.81 ug/L
97th percentile 4 day average = 966.662 ug/L
97th percentile 30 day average= 700.716 ug/L
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

541 ug/L
621 ug/L

MSTRANTI DATA SOURCE REPORT

(DuPont Teijin: Storm Water Screening Criteria)

Stream Information	
Mean Hardness	Ambient Data (2-JMS087.01) is used because there is no effluent data for the Storm Water pH, temperature or hardness.
90% Temperature (annual)	
90% Temperature (wet season)	
90% Maximum pH	
10% Maximum pH	
Tier Designation	Flow Frequency Memo (11/2/10)
Stream Flows & Mixing Information	
All Data	Default values of 1 MGD are entered for 7Q10 and 1Q10 flows along with 100% mixing. These values in combination with a 1 MGD design flow calculate 2x the acute standard as the acute WLA.
Effluent Information	
Mean Hardness	Ambient Data (2-JMS087.01) is used because there is no effluent data for the Storm Water pH, temperature or hardness.
90% Temperature (annual)	
90% Temperature (wet season)	
90% Maximum pH	
10% Maximum pH	
Discharge Flow	Used a value of 1 MGD as indicated above.

Data Location:

Ambient Data – Attachment A

Flow Frequency Memo

FRESHWATER
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: DuPont Teijin -SW Permit No.: VA0003077

Receiving Stream: James River (Lower) Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information		
Mean Hardness (as CaCO3) =	66.7	mg/L
90% Temperature (Annual) =	30.6	deg C
90% Temperature (Wet season) =	NA	deg C
90% Maximum pH =	8	SU
10% Maximum pH =	7.1	SU
Tier Designation (1 or 2) =	1	
Public Water Supply (PWS) Y/N? =	y	
Trout Present Y/N? =	N	
Early Life Stages Present Y/N? =	y	

Stream Flows		
1Q10 (Annual) =	1	MGD
7Q10 (Annual) =	1	MGD
30Q10 (Annual) =		MGD
1Q10 (Wet season) =	NA	MGD
30Q10 (Wet season)	NA	MGD
30Q5 =		MGD
Harmonic Mean =		MGD

Mixing Information		
Annual - 1Q10 Mix =	100	%
- 7Q10 Mix =	100	%
- 30Q10 Mix =	100	%
Wet Season - 1Q10 Mix =	100	%
- 30Q10 Mix =	100	%

Effluent Information		
Mean Hardness (as CaCO3) =	66.7	mg/L
90% Temp (Annual) =	30.6	deg C
90% Temp (Wet season) =	NA	deg C
90% Maximum pH =	8	SU
10% Maximum pH =	7.1	SU
Discharge Flow =	1	MGD

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Acenapthene	5	--	--	6.7E+02	9.9E+02	--	--	6.7E+02	9.9E+02	--	--	--	--	--	--	--	--	**--**	**--**	**6.7E+02**	**9.9E+02**
Acrolein	0	--	--	6.1E+00	9.3E+00	--	--	6.1E+00	9.3E+00	--	--	--	--	--	--	--	--	**--**	**--**	**6.1E+00**	**9.3E+00**
Acrylonitrile[C]	0	--	--	5.1E-01	2.5E+00	--	--	5.1E-01	2.5E+00	--	--	--	--	--	--	--	--	**--**	**--**	**5.1E-01**	**2.5E+00**
Aldrin [C]	0	3.0E+00	--	4.9E-04	5.0E-04	6.0E+00	--	4.9E-04	5.0E-04	--	--	--	--	--	--	--	--	**6.0E+00**	**--**	**4.9E-04**	**5.0E-04**
Ammonia-N (mg/l) (Yearly)	0	8.41E+00	8.63E-01	--	--	1.7E+01	8.6E-01	--	--	--	--	--	--	--	--	--	--	**1.7E+01**	**8.6E-01**	**--**	**--**
Ammonia-N (mg/l) (High Flow)	0	#VALUE!	#VALUE!	--	--	#VALUE!	#######	--	--	--	--	--	--	--	--	--	--	**#VALUE!**	**#VALUE!**	**--**	**--**
Anthracene	0	--	--	8.3E+03	4.0E+04	--	--	8.3E+03	4.0E+04	--	--	--	--	--	--	--	--	**--**	**--**	**8.3E+03**	**4.0E+04**
Antimony	0	--	--	5.6E+00	6.4E+02	--	--	5.6E+00	6.4E+02	--	--	--	--	--	--	--	--	**--**	**--**	**5.6E+00**	**6.4E+02**
Arsenic	o	3.4E+02	1.5E+02	1.0E+01	--	6.8E+02	3.0E+02	1.0E+01	--	--	--	--	--	--	--	--	--	**6.8E+02**	**3.0E+02**	**1.0E+01**	**--**
Barium	0	--	--	2.0E+03	--	--	--	2.0E+03	--	--	--	--	--	--	--	--	--	**--**	**--**	**2.0E+03**	**--**
Benzene [C]	0	--	--	2.2E+01	5.1E+02	--	--	2.2E+01	5.1E+02	--	--	--	--	--	--	--	--	**--**	**--**	**2.2E+01**	**5.1E+02**
Benzidine[C]	0	--	--	8.6E-04	2.0E-03	--	--	8.6E-04	2.0E-03	--	--	--	--	--	--	--	--	**--**	**--**	**8.6E-04**	**2.0E-03**
Benzo (a) anthracene [C]	0	--	--	3.8E-02	1.8E-01	--	--	3.8E-02	1.8E-01	--	--	--	--	--	--	--	--	**--**	**--**	**3.8E-02**	**1.8E-01**
Benzo (b) fluoranthene [C]	0	--	--	3.8E-02	1.8E-01	--	--	3.8E-02	1.8E-01	--	--	--	--	--	--	--	--	**--**	**--**	**3.8E-02**	**1.8E-01**
Benzo (k) fluoranthene [C]	0	--	--	3.8E-02	1.8E-01	--	--	3.8E-02	1.8E-01	--	--	--	--	--	--	--	--	**--**	**--**	**3.8E-02**	**1.8E-01**
Benzo (a) pyrene [C]	0	--	--	3.8E-02	1.8E-01	--	--	3.8E-02	1.8E-01	--	--	--	--	--	--	--	--	**--**	**--**	**3.8E-02**	**1.8E-01**
Bis2-Chloroethyl Ether [C]	0	--	--	3.0E-01	5.3E+00	--	--	3.0E-01	5.3E+00	--	--	--	--	--	--	--	--	**--**	**--**	**3.0E-01**	**5.3E+00**
Bis2-Chloroisopropyl Ether	0	--	--	1.4E+03	6.5E+04	--	--	1.4E+03	6.5E+04	--	--	--	--	--	--	--	--	**--**	**--**	**1.4E+03**	**6.5E+04**
Bis 2-Ethylhexyl Phthalate [C]	0	--	--	1.2E+01	2.2E+01	--	--	1.2E+01	2.2E+01	--	--	--	--	--	--	--	--	**--**	**--**	**1.2E+01**	**2.2E+01**
Bromoform [C]	0	--	--	4.3E+01	1.4E+03	--	--	4.3E+01	1.4E+03	--	--	--	--	--	--	--	--	**--**	**--**	**4.3E+01**	**1.4E+03**
Butylbenzylphthalate	0	--	--	1.5E+03	1.9E+03	--	--	1.5E+03	1.9E+03	--	--	--	--	--	--	--	--	**--**	**--**	**1.5E+03**	**1.9E+03**
Cadmium	0	2.5E+00	8.3E-01	5.0E+00	--	5.0E+00	1.7E+00	5.0E+00	--	--	--	--	--	--	--	--	--	**5.0E+00**	**1.7E+00**	**5.0E+00**	**--**
Carbon Tetrachloride [C]	0	--	--	2.3E+00	1.6E+01	--	--	2.3E+00	1.6E+01	--	--	--	--	--	--	--	--	**--**	**--**	**2.3E+00**	**1.6E+01**
Chlordane [C]	0	2.4E+00	4.3E-03	8.0E-03	8.1E-03	4.8E+00	8.6E-03	8.0E-03	8.1E-03	--	--	--	--	--	--	--	--	**4.8E+00**	**8.6E-03**	**8.0E-03**	**8.1E-03**
Chloride	0	8.6E+05	2.3E+05	2.5E+05	--	1.7E+06	4.6E+05	2.5E+05	--	--	--	--	--	--	--	--	--	**1.7E+06**	**4.6E+05**	**2.5E+05**	**--**
TRC	0	1.9E+01	1.1E+01	--	--	3.8E+01	2.2E+01	--	--	--	--	--	--	--	--	--	--	**3.8E+01**	**2.2E+01**	**--**	**--**
Chlorobenzene	0	--	--	1.3E+02	1.6E+03	--	--	1.3E+02	1.6E+03	--	--	--	--	--	--	--	--	**--**	**--**	**1.3E+02**	**1.6E+03**
Chlorodibromomethane[C]	0	--	--	4.0E+00	1.3E+02	--	--	4.0E+00	1.3E+02	--	--	--	--	--	--	--	--	**--**	**--**	**4.0E+00**	**1.3E+02**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Chloroform	0	--	--	3.4E+02	1.1E+04	--	--	3.4E+02	1.1E+04	--	--	--	--	--	--	--	--	**--**	**--**	**3.4E+02**	**1.1E+04**
2-Chloronaphthalene	0	--	--	1.0E+03	1.6E+03	--	--	1.0E+03	1.6E+03	--	--	--	--	--	--	--	--	**--**	**--**	**1.0E+03**	**1.6E+03**
2-Chlorophenol	0	--	--	8.1E+01	1.5E+02	--	--	8.1E+01	1.5E+02	--	--	--	--	--	--	--	--	**--**	**--**	**8.1E+01**	**1.5E+02**
Chlorpyrifos	0	8.3E-02	4.1E-02	--	--	1.7E-01	8.2E-02	--	--	--	--	--	--	--	--	--	--	**1.7E-01**	**8.2E-02**	**--**	**--**
Chromium III	0	4.1E+02	5.3E+01	--	--	8.2E+02	1.1E+02	--	--	--	--	--	--	--	--	--	--	**8.2E+02**	**1.1E+02**	**--**	**--**
Chromium VI	0	1.6E+01	1.1E+01	--	--	3.2E+01	2.2E+01	--	--	--	--	--	--	--	--	--	--	**3.2E+01**	**2.2E+01**	**--**	**--**
Chromium, Total	0	--	--	1.0E+02	--	--	--	1.0E+02	--	--	--	--	--	--	--	--	--	**--**	**--**	**1.0E+02**	**--**
Chrysene [C]	0	--	--	3.8E-03	1.8E-02	--	--	3.8E-03	1.8E-02	--	--	--	--	--	--	--	--	**--**	**--**	**3.8E-03**	**1.8E-02**
Copper	0	9.2E+00	6.3E+00	1.3E+03	--	1.8E+01	1.3E+01	1.3E+03	--	--	--	--	--	--	--	--	--	**1.8E+01**	**1.3E+01**	**1.3E+03**	**--**
Cyanide, Free	0	2.2E+01	5.2E+00	1.4E+02	1.6E+04	4.4E+01	1.0E+01	1.4E+02	1.6E+04	--	--	--	--	--	--	--	--	**4.4E+01**	**1.0E+01**	**1.4E+02**	**1.6E+04**
DDD [C]	0	--	--	3.1E-03	3.1E-03	--	--	3.1E-03	3.1E-03	--	--	--	--	--	--	--	--	**--**	**--**	**3.1E-03**	**3.1E-03**
DDE [C]	0	--	--	2.2E-03	2.2E-03	--	--	2.2E-03	2.2E-03	--	--	--	--	--	--	--	--	**--**	**--**	**2.2E-03**	**2.2E-03**
DDT [C]	0	1.1E+00	1.0E-03	2.2E-03	2.2E-03	2.2E+00	2.0E-03	2.2E-03	2.2E-03	--	--	--	--	--	--	--	--	**2.2E+00**	**2.0E-03**	**2.2E-03**	**2.2E-03**
Demeton	0	--	1.0E-01	--	--	--	2.0E-01	--	--	--	--	--	--	--	--	--	--	**--**	**2.0E-01**	**--**	**--**
Diazinon	0	1.7E-01	1.7E-01	--	--	3.4E-01	3.4E-01	--	--	--	--	--	--	--	--	--	--	**3.4E-01**	**3.4E-01**	**--**	**--**
Dibenz(a,h)anthracene [C]	0	--	--	3.8E-02	1.8E-01	--	--	3.8E-02	1.8E-01	--	--	--	--	--	--	--	--	**--**	**--**	**3.8E-02**	**1.8E-01**
1,2-Dichlorobenzene	0	--	--	4.2E+02	1.3E+03	--	--	4.2E+02	1.3E+03	--	--	--	--	--	--	--	--	**--**	**--**	**4.2E+02**	**1.3E+03**
1,3-Dichlorobenzene	0	--	--	3.2E+02	9.6E+02	--	--	3.2E+02	9.6E+02	--	--	--	--	--	--	--	--	**--**	**--**	**3.2E+02**	**9.6E+02**
1,4-Dichlorobenzene	0	--	--	6.3E+01	1.9E+02	--	--	6.3E+01	1.9E+02	--	--	--	--	--	--	--	--	**--**	**--**	**6.3E+01**	**1.9E+02**
3,3-Dichlorobenzidine[C]	0	--	--	2.1E-01	2.8E-01	--	--	2.1E-01	2.8E-01	--	--	--	--	--	--	--	--	**--**	**--**	**2.1E-01**	**2.8E-01**
Dichlorobromomethane [C]	0	--	--	5.5E+00	1.7E+02	--	--	5.5E+00	1.7E+02	--	--	--	--	--	--	--	--	**--**	**--**	**5.5E+00**	**1.7E+02**
1,2-Dichloroethane [C]	0	--	--	3.8E+00	3.7E+02	--	--	3.8E+00	3.7E+02	--	--	--	--	--	--	--	--	**--**	**--**	**3.8E+00**	**3.7E+02**
1,1-Dichloroethylene	0	--	--	3.3E+02	7.1E+03	--	--	3.3E+02	7.1E+03	--	--	--	--	--	--	--	--	**--**	**--**	**3.3E+02**	**7.1E+03**
1,2-trans-dichloroethylene	0	--	--	1.4E+02	1.0E+04	--	--	1.4E+02	1.0E+04	--	--	--	--	--	--	--	--	**--**	**--**	**1.4E+02**	**1.0E+04**
2,4-Dichlorophenol	0	--	--	7.7E+01	2.9E+02	--	--	7.7E+01	2.9E+02	--	--	--	--	--	--	--	--	**--**	**--**	**7.7E+01**	**2.9E+02**
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	1.0E+02	--	--	--	1.0E+02	--	--	--	--	--	--	--	--	--	**--**	**--**	**1.0E+02**	**--**
1,2-Dichloropropane[C]	0	--	--	5.0E+00	1.5E+02	--	--	5.0E+00	1.5E+02	--	--	--	--	--	--	--	--	**--**	**--**	**5.0E+00**	**1.5E+02**
1,3-Dichloropropene [C]	0	--	--	3.4E+00	2.1E+02	--	--	3.4E+00	2.1E+02	--	--	--	--	--	--	--	--	**--**	**--**	**3.4E+00**	**2.1E+02**
Dieldrin [C]	0	2.4E-01	5.6E-02	5.2E-04	5.4E-04	4.8E-01	1.1E-01	5.2E-04	5.4E-04	--	--	--	--	--	--	--	--	**4.8E-01**	**1.1E-01**	**5.2E-04**	**5.4E-04**
Diethyl Phthalate	0	--	--	1.7E+04	4.4E+04	--	--	1.7E+04	4.4E+04	--	--	--	--	--	--	--	--	**--**	**--**	**1.7E+04**	**4.4E+04**
2,4-Dimethylphenol	0	--	--	3.8E+02	8.5E+02	--	--	3.8E+02	8.5E+02	--	--	--	--	--	--	--	--	**--**	**--**	**3.8E+02**	**8.5E+02**
Dimethyl Phthalate	0	--	--	2.7E+05	1.1E+06	--	--	2.7E+05	1.1E+06	--	--	--	--	--	--	--	--	**--**	**--**	**2.7E+05**	**1.1E+06**
Di-n-Butyl Phthalate	0	--	--	2.0E+03	4.5E+03	--	--	2.0E+03	4.5E+03	--	--	--	--	--	--	--	--	**--**	**--**	**2.0E+03**	**4.5E+03**
2,4 Dinitrophenol	0	--	--	6.9E+01	5.3E+03	--	--	6.9E+01	5.3E+03	--	--	--	--	--	--	--	--	**--**	**--**	**6.9E+01**	**5.3E+03**
2-Methyl-4,6-Dinitrophenol	0	--	--	1.3E+01	2.8E+02	--	--	1.3E+01	2.8E+02	--	--	--	--	--	--	--	--	**--**	**--**	**1.3E+01**	**2.8E+02**
2,4-Dinitrotoluene [C]	0	--	--	1.1E+00	3.4E+01	--	--	1.1E+00	3.4E+01	--	--	--	--	--	--	--	--	**--**	**--**	**1.1E+00**	**3.4E+01**
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin	0	--	--	5.0E-08	5.1E-08	--	--	5.0E-08	5.1E-08	--	--	--	--	--	--	--	--	**--**	**--**	**5.0E-08**	**5.1E-08**
1,2-Diphenylhydrazine[C]	0	--	--	3.6E-01	2.0E+00	--	--	3.6E-01	2.0E+00	--	--	--	--	--	--	--	--	**--**	**--**	**3.6E-01**	**2.0E+00**
Alpha-Endosulfan	0	2.2E-01	5.6E-02	6.2E+01	8.9E+01	4.4E-01	1.1E-01	6.2E+01	8.9E+01	--	--	--	--	--	--	--	--	**4.4E-01**	**1.1E-01**	**6.2E+01**	**8.9E+01**
Beta-Endosulfan	0	2.2E-01	5.6E-02	6.2E+01	8.9E+01	4.4E-01	1.1E-01	6.2E+01	8.9E+01	--	--	--	--	--	--	--	--	**4.4E-01**	**1.1E-01**	**6.2E+01**	**8.9E+01**
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	4.4E-01	1.1E-01	--	--	--	--	--	--	--	--	--	--	**4.4E-01**	**1.1E-01**	**--**	**--**
Endosulfan Sulfate	0	--	--	6.2E+01	8.9E+01	--	--	6.2E+01	8.9E+01	--	--	--	--	--	--	--	--	**--**	**--**	**6.2E+01**	**8.9E+01**
Endrin	0	8.6E-02	3.6E-02	5.9E-02	6.0E-02	1.7E-01	7.2E-02	5.9E-02	6.0E-02	--	--	--	--	--	--	--	--	**1.7E-01**	**7.2E-02**	**5.9E-02**	**6.0E-02**
Endrin Aldehyde	0	--	--	2.9E-01	3.0E-01	--	--	2.9E-01	3.0E-01	--	--	--	--	--	--	--	--	**--**	**--**	**2.9E-01**	**3.0E-01**
Ethylbenzene	0	--	--	5.3E+02	2.1E+03	--	--	5.3E+02	2.1E+03	--	--	--	--	--	--	--	--	**--**	**--**	**5.3E+02**	**2.1E+03**
Fluoranthene	0	--	--	1.3E+02	1.4E+02	--	--	1.3E+02	1.4E+02	--	--	--	--	--	--	--	--	**--**	**--**	**1.3E+02**	**1.4E+02**
Fluorene	0	--	--	1.1E+03	5.3E+03	--	--	1.1E+03	5.3E+03	--	--	--	--	--	--	--	--	**--**	**--**	**1.1E+03**	**5.3E+03**
Foaming Agents	0	--	--	5.0E+02	--	--	--	5.0E+02	--	--	--	--	--	--	--	--	--	**--**	**--**	**5.0E+02**	**--**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Guthion	0	--	1.0E-02	--	--	--	2.0E-02	--	--	--	--	--	--	--	--	--	--	**--**	**2.0E-02**	**--**	**--**
Heptachlor [C]	0	5.2E-01	3.8E-03	7.9E-04	7.9E-04	1.0E+00	7.6E-03	7.9E-04	7.9E-04	--	--	--	--	--	--	--	--	**1.0E+00**	**7.6E-03**	**7.9E-04**	**7.9E-04**
Heptachlor Epoxide[C]	0	5.2E-01	3.8E-03	3.9E-04	3.9E-04	1.0E+00	7.6E-03	3.9E-04	3.9E-04	--	--	--	--	--	--	--	--	**1.0E+00**	**7.6E-03**	**3.9E-04**	**3.9E-04**
Hexachlorobenzene[C]	0	--	--	2.8E-03	2.9E-03	--	--	2.8E-03	2.9E-03	--	--	--	--	--	--	--	--	**--**	**--**	**2.8E-03**	**2.9E-03**
Hexachlorobutadiene[C]	0	--	--	4.4E+00	1.8E+02	--	--	4.4E+00	1.8E+02	--	--	--	--	--	--	--	--	**--**	**--**	**4.4E+00**	**1.8E+02**
Hexachlorocyclohexane Alpha-BHC[C]	0	--	--	2.6E-02	4.9E-02	--	--	2.6E-02	4.9E-02	--	--	--	--	--	--	--	--	**--**	**--**	**2.6E-02**	**4.9E-02**
Hexachlorocyclohexane Beta-BHC[C]	0	--	--	9.1E-02	1.7E-01	--	--	9.1E-02	1.7E-01	--	--	--	--	--	--	--	--	**--**	**--**	**9.1E-02**	**1.7E-01**
Hexachlorocyclohexane Gamma-BHC[C] (Lindane)	0	9.5E-01	--	9.8E-01	1.8E+00	1.9E+00	--	9.8E-01	1.8E+00	--	--	--	--	--	--	--	--	**1.9E+00**	**--**	**9.8E-01**	**1.8E+00**
Hexachlorocyclopentadiene	0	--	--	4.0E+01	1.1E+03	--	--	4.0E+01	1.1E+03	--	--	--	--	--	--	--	--	**--**	**--**	**4.0E+01**	**1.1E+03**
Hexachloroethane[C]	0	--	--	1.4E+01	3.3E+01	--	--	1.4E+01	3.3E+01	--	--	--	--	--	--	--	--	**--**	**--**	**1.4E+01**	**3.3E+01**
Hydrogen Sulfide	0	--	2.0E+00	--	--	--	4.0E+00	--	--	--	--	--	--	--	--	--	--	**--**	**4.0E+00**	**--**	**--**
Indeno (1,2,3-cd) pyrene [C]	0	--	--	3.8E-02	1.8E-01	--	--	3.8E-02	1.8E-01	--	--	--	--	--	--	--	--	**--**	**--**	**3.8E-02**	**1.8E-01**
Iron	0	--	--	3.0E+02	--	--	--	3.0E+02	--	--	--	--	--	--	--	--	--	**--**	**--**	**3.0E+02**	**--**
Isophorone[C]	0	--	--	3.5E+02	9.6E+03	--	--	3.5E+02	9.6E+03	--	--	--	--	--	--	--	--	**--**	**--**	**3.5E+02**	**9.6E+03**
Kepone	0	--	0.0E+00	--	--	--	0.0E+00	--	--	--	--	--	--	--	--	--	--	**--**	**0.0E+00**	**--**	**--**
Lead	0	7.1E+01	8.1E+00	1.5E+01	--	1.4E+02	1.6E+01	1.5E+01	--	--	--	--	--	--	--	--	--	**1.4E+02**	**1.6E+01**	**1.5E+01**	**--**
Malathion	0	--	1.0E-01	--	--	--	2.0E-01	--	--	--	--	--	--	--	--	--	--	**--**	**2.0E-01**	**--**	**--**
Manganese	0	--	--	5.0E+01	--	--	--	5.0E+01	--	--	--	--	--	--	--	--	--	**--**	**--**	**5.0E+01**	**--**
Mercury	0	1.4E+00	7.7E-01	- -	- -	2.8E+00	1.5E+00	- -	- -	--	--	--	--	--	--	--	--	**2.8E+00**	**1.5E+00**	**- -**	**- -**
Methyl Bromide	0	--	--	4.7E+01	1.5E+03	--	--	4.7E+01	1.5E+03	--	--	--	--	--	--	--	--	**--**	**--**	**4.7E+01**	**1.5E+03**
Methylene Chloride [C]	0	--	--	4.6E+01	5.9E+03	--	--	4.6E+01	5.9E+03	--	--	--	--	--	--	--	--	**--**	**--**	**4.6E+01**	**5.9E+03**
Methoxychlor	0	--	3.0E-02	1.0E+02	--	--	6.0E-02	1.0E+02	--	--	--	--	--	--	--	--	--	**--**	**6.0E-02**	**1.0E+02**	**--**
Mirex	0	--	0.0E+00	--	--	--	0.0E+00	--	--	--	--	--	--	--	--	--	--	**--**	**0.0E+00**	**--**	**--**
Nickel	0	1.3E+02	1.4E+01	6.1E+02	4.6E+03	2.6E+02	2.9E+01	6.1E+02	4.6E+03	--	--	--	--	--	--	--	--	**2.6E+02**	**2.9E+01**	**6.1E+02**	**4.6E+03**
Nitrate (as N)	0	--	--	1.0E+04	--	--	--	1.0E+04	--	--	--	--	--	--	--	--	--	**--**	**--**	**1.0E+04**	**--**
Nitrobenzene	0	--	--	1.7E+01	6.9E+02	--	--	1.7E+01	6.9E+02	--	--	--	--	--	--	--	--	**--**	**--**	**1.7E+01**	**6.9E+02**
N-Nitrosodimethylamine[C]	0	--	--	6.9E-03	3.0E+01	--	--	6.9E-03	3.0E+01	--	--	--	--	--	--	--	--	**--**	**--**	**6.9E-03**	**3.0E+01**
N-Nitrosodiphenylamine[C]	0	--	--	3.3E+01	6.0E+01	--	--	3.3E+01	6.0E+01	--	--	--	--	--	--	--	--	**--**	**--**	**3.3E+01**	**6.0E+01**
N-Nitrosodi-n-propylamine[C]	0	--	--	5.0E-02	5.1E+00	--	--	5.0E-02	5.1E+00	--	--	--	--	--	--	--	--	**--**	**--**	**5.0E-02**	**5.1E+00**
Nonylphenol	0	2.8E+01	6.6E+00	--	--	5.6E+01	1.3E+01	--	--	--	--	--	--	--	--	--	--	**5.6E+01**	**1.3E+01**	**--**	**--**
Parathion	0	6.5E-02	1.3E-02	--	--	1.3E-01	2.6E-02	--	--	--	--	--	--	--	--	--	--	**1.3E-01**	**2.6E-02**	**--**	**--**
PCB Total[C]	0	--	1.4E-02	6.4E-04	6.4E-04	--	2.8E-02	6.4E-04	6.4E-04	--	--	--	--	--	--	--	--	**--**	**2.8E-02**	**6.4E-04**	**6.4E-04**
Pentachlorophenol [C]	0	9.6E+00	7.4E+00	2.7E+00	3.0E+01	1.9E+01	1.5E+01	2.7E+00	3.0E+01	--	--	--	--	--	--	--	--	**1.9E+01**	**1.5E+01**	**2.7E+00**	**3.0E+01**
Phenol	0	--	--	1.0E+04	8.6E+05	--	--	1.0E+04	8.6E+05	--	--	--	--	--	--	--	--	**--**	**--**	**1.0E+04**	**8.6E+05**
Pyrene	0	--	--	8.3E+02	4.0E+03	--	--	8.3E+02	4.0E+03	--	--	--	--	--	--	--	--	**--**	**--**	**8.3E+02**	**4.0E+03**
Radionuclides	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**--**	**--**	**--**	**--**
Gross Alpha Activity (pCi/L)	0	--	--	1.5E+01	--	--	--	1.5E+01	--	--	--	--	--	--	--	--	--	**--**	**--**	**1.5E+01**	**--**
Beta and Photon Activity (mrem/yr)	0	--	--	4.0E+00	4.0E+00	--	--	4.0E+00	4.0E+00	--	--	--	--	--	--	--	--	**--**	**--**	**4.0E+00**	**4.0E+00**
Radium 226 + 228 (pCi/L)	0	--	--	5.0E+00	--	--	--	5.0E+00	--	--	--	--	--	--	--	--	--	**--**	**--**	**5.0E+00**	**--**
Uranium (ug/l)	0	--	--	3.0E+01	--	--	--	3.0E+01	--	--	--	--	--	--	--	--	--	**--**	**--**	**3.0E+01**	**--**
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	1.7E+02	4.2E+03	4.0E+01	1.0E+01	1.7E+02	4.2E+03	--	--	--	--	--	--	--	--	**4.0E+01**	**1.0E+01**	**1.7E+02**	**4.2E+03**
Silver	0	1.7E+00	--	--	--	3.4E+00	--	--	--	--	--	--	--	--	--	--	--	**3.4E+00**	**--**	**--**	**--**
Sulfate	0	--	--	2.5E+05	--	--	--	2.5E+05	--	--	--	--	--	--	--	--	--	**--**	**--**	**2.5E+05**	**--**
1,1,2,2-Tetrachloroethane[C]	0	--	--	1.7E+00	4.0E+01	--	--	1.7E+00	4.0E+01	--	--	--	--	--	--	--	--	**--**	**--**	**1.7E+00**	**4.0E+01**
Tetrachloroethylene[C]	0	--	--	6.9E+00	3.3E+01	--	--	6.9E+00	3.3E+01	--	--	--	--	--	--	--	--	**--**	**--**	**6.9E+00**	**3.3E+01**
Thallium	0	--	--	2.4E-01	4.7E-01	--	--	2.4E-01	4.7E-01	--	--	--	--	--	--	--	--	**--**	**--**	**2.4E-01**	**4.7E-01**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Toluene	0	--	--	5.1E+02	6.0E+03	--	--	5.1E+02	6.0E+03	--	--	--	--	--	--	--	--	**--**	**--**	**5.1E+02**	**6.0E+03**
Total dissolved solids	0	--	--	5.0E+05	--	--	--	5.0E+05	--	--	--	--	--	--	--	--	--	**--**	**--**	**5.0E+05**	**--**
Toxaphene [C]	0	7.3E-01	2.0E-04	2.8E-03	2.8E-03	1.5E+00	4.0E-04	2.8E-03	2.8E-03	--	--	--	--	--	--	--	--	**1.5E+00**	**4.0E-04**	**2.8E-03**	**2.8E-03**
Tributyltin	0	4.6E-01	7.2E-02	--	--	9.2E-01	1.4E-01	--	--	--	--	--	--	--	--	--	--	**9.2E-01**	**1.4E-01**	**--**	**--**
1,2,4-Trichlorobenzene	0	--	--	3.5E+01	7.0E+01	--	--	3.5E+01	7.0E+01	--	--	--	--	--	--	--	--	**--**	**--**	**3.5E+01**	**7.0E+01**
1,1,2-Trichloroethane[C]	0	--	--	5.9E+00	1.6E+02	--	--	5.9E+00	1.6E+02	--	--	--	--	--	--	--	--	**--**	**--**	**5.9E+00**	**1.6E+02**
Trichloroethylene [C]	0	--	--	2.5E+01	3.0E+02	--	--	2.5E+01	3.0E+02	--	--	--	--	--	--	--	--	**--**	**--**	**2.5E+01**	**3.0E+02**
2,4,6-Trichlorophenol [C]	0	--	--	1.4E+01	2.4E+01	--	--	1.4E+01	2.4E+01	--	--	--	--	--	--	--	--	**--**	**--**	**1.4E+01**	**2.4E+01**
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	5.0E+01	--	--	--	5.0E+01	--	--	--	--	--	--	--	--	--	**--**	**--**	**5.0E+01**	**--**
Vinyl Chloride[C]	0	--	--	2.5E-01	2.4E+01	--	--	2.5E-01	2.4E+01	--	--	--	--	--	--	--	--	**--**	**--**	**2.5E-01**	**2.4E+01**
Zinc	0	8.3E+01	8.4E+01	7.4E+03	2.6E+04	1.7E+02	1.7E+02	7.4E+03	2.6E+04	--	--	--	--	--	--	--	--	**1.7E+02**	**1.7E+02**	**7.4E+03**	**2.6E+04**

Notes:

1. All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
2. Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals
3. Metals measured as Dissolved, unless specified otherwise
4. "C" indicates a carcinogenic parameter
5. Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.
   Antidegradation WLAs are based upon a complete mix.
6. Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic
   = (0.1(WQC - background conc.) + background conc.) for human health
7. WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	5.6E+00
Arsenic	1.0E+01
Barium	2.0E+03
Cadmium	9.9E-01
Chromium III	6.4E+01
Chromium VI	1.3E+01
Copper	7.3E+00
Iron	3.0E+02
Lead	9.7E+00
Manganese	5.0E+01
Mercury	9.2E-01
Nickel	1.7E+01
Selenium	6.0E+00
Silver	1.4E+00
Zinc	6.7E+01

Note: do not use QL's lower than the minimum QL's provided in agency guidance

ATTACHMENT G

WET Testing Evaluation

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY
Piedmont Regional Office

4949-A Cox Road Glen Allen, VA 23060 **(804) 527- 5020**

SUBJECT: Toxics Management Program and Toxicity Test Data Review: DuPont Teijin Films, VPDES Permit No. VA0003077

TO: Deborah DeBiasi, CO – State Coordinator for TMP and Pretreatment

FROM: Emilee Carpenter, PRO

DATE: February 1, 2011

COPIES: File

Facility Name: DuPont Teijin Films
Permit Number: VA0003077
Receiving Stream: James River
Facility SIC: 3081 – Polyester Film Manufacture; 2821 – Polyester Resin Manufacture
In-Stream Waste Concentration (IWC_a): Outfall 001 = 1.2%

FACILITY DESCRIPTION

E.I. duPont de Nemours and Company owns and operates a polyester film manufacturing plant located in the Bermuda Hundred area of Chesterfield County. Wastewater from the manufacturing process and contaminated ground water are treated in a separate industrial wastewater treatment plant (extended aeration, 0.048 MGD) which discharges through Outfall 101 prior to combining with treated sanitary wastewater, cooling tower and steam boiler blowdown, and stormwater runoff, all of which are discharged through Outfall 001 to the James River. Only Outfall 001 is addressed in the Toxics Management Program (TMP). Outfall 001 is the only outfall that discharges process water under normal conditions. Outfall 003 may discharge process water under exceptional storm events, in which case it is reasonable to assume that dilution controls any potential toxicity.

The acute instream waste concentration (IWC_a) for this facility (noted above) is calculated using the acute and chronic mixing ratios generated in the 1998 calibrated and verified mixing model.

FACILITY REQUIREMENTS

The current permit was reissued effective March 22, 2006 and includes a Toxics Management Program special condition requiring annual monitoring for acute toxicity at Outfall 001. The permit requires that 48 hour static tests be run using 24-hour flow –proportioned composite samples. The tests are run using *Ceriodaphnia dubia* and *Pimephales promelas* with an LC_{50} endpoint of 5% equivalent to a TU_a of 20.

DATA SUMMARY

Outfall 001

TEST DATE	Organism	LC_{50}	PERCENT SURVIVAL IN 100% EFFLUENT	LABORATORY
1st Annual – January 2006	Ceriodaphnia dubia	>100	65	Coastal Bioanalysts, Inc
	Pimephales promelas	>100	100	Coastal Bioanalysts, Inc
2nd Annual – April 2007	Ceriodaphnia dubia	60.3	10	Coastal Bioanalysts, Inc
	Pimephales promelas	>100	100	Coastal Bioanalysts, Inc
3rd Annual – January 2008	Ceriodaphnia dubia	6.9	0	Coastal Bioanalysts, Inc
	Pimephales promelas	>100	95	Coastal Bioanalysts, Inc
4th Annual – April 2009	Ceriodaphnia dubia	56.5	10	Coastal Bioanalysts, Inc
	Pimephales promelas	>100	100	Coastal Bioanalysts, Inc
5th Annual – April 2010	Ceriodaphnia dubia	>100	60	Coastal Bioanalysts, Inc
	Pimephales promelas	>100	100	Coastal Bioanalysts, Inc

CONCLUSION AND RECOMMENDATION

Results of the whole effluent toxicity (WET) tests performed since the permit reissuance in 2006 indicate compliance with the TMP endpoint in the current permit. During this time period, all tests resulted in an LC_{50}>5%. The mixing zone model from 1998 that establishes acute and chronic mix ratios is still applicable to the current discharge. These ratios are used in conjunction with WETLIM10 to establish an appropriate LC_{50} endpoint for the WET tests. Because the ratios have not changed, the LC_{50} endpoint calculated in WETLIM10 is still 5%. Since the IWC of this effluent during low flow conditions (7Q10) is significantly lower than 1%, chronic toxicity assessment is not a concern for the Outfall 001 discharge.

Although the effluent does demonstrate acute toxicity at higher concentrations, it does not show reasonable potential to cause in stream toxicity. A STATS.exe analysis was performed using a WLA_a of 20 TU_a and the TU_a results for *Ceriodaphnia dubia* over the past five years. *Ceriodaphnia dubia* is the more sensitive species, and WET results have consistently shown higher toxicity for this organism than for Pimephales promelas. The STATS.exe output indicates that reasonable potential for instream toxicity does not exist for *Ceriodaphnia dubia*. Consequently, a limitation is not needed at this time.

It is recommended that the current TMP monitoring program for acute toxicity be continued with an LC_{50} = 5%. Because neither *Ceriodaphnia dubia* nor *Pimephales promelas* demonstrated 100% survival in 100% effluent over the course of the permit term, continued monitoring is recommended for both species.

The draft permit language is attached.

DRAFT TMP LANGUAGE FOR VPDES PERMIT NO. VA0003077

C. Toxics Management Program

1. Biological Monitoring

a. In accordance with the schedule in **Part I.C.2**. below, the permittee shall conduct annual acute toxicity tests for the duration of the permit. The permittee shall collect 24-hour flow-proportioned composite samples of final effluent from outfall 001.

Pimephales promelas removed per Owner Comments. See DeBiasi concurrence email (5/23/11) below.

The acute tests to use are:

48 Hour Static Acute Test using *Ceriodaphnia dubia*
48 Hour Static Acute Test using *Pimephales promelas*

These acute tests are to be conducted using a minimum of 5 dilutions, derived geometrically, for calculation of a valid LC_{50}. Express the results as TUa (Acute Toxicity Units) by dividing 100/LC50 for DMR reporting.

b. The test dilutions should be able to determine compliance with an acute LC50 = 5% equivalent to a TUa of = 20.

c. The permittee may provide additional samples to address data variability. These data shall be reported and may be included in the evaluation of effluent toxicity. Test procedures and reporting shall be in accordance with the WET testing methods cited in 40CFR 136.3.

d. The test data will be statistically evaluated for reasonable potential at the conclusion of the test period. The data may be evaluated sooner if requested by the permittee, or if toxicity has been noted. Should evaluation of the data indicate that a limit is needed, a WET limit and compliance schedule will be required and the toxicity tests of Part I.C.1.a may be discontinued.

e. The permit may be modified or revoked and reissued to include pollutant specific limits should it be demonstrated that toxicity is due to specific parameters. The pollutant specific limits must control the toxicity of the effluent.

2. Reporting Schedule

The permittee shall report the results on the DMR and submit a copy of each toxicity test report in accordance with the following schedule:

Period	Annual Compliance Period End Date	DMR/Report Due Date
1st Annual	4/30/2011	5/10/2011
2nd Annual	4/30/2012	5/10/2012
3rd Annual	4/30/2013	5/10/2013
4th Annual	4/30/2014	5/10/2014
5th Annual	4/30/2015	5/10/2016

Carpenter, Emilee (DEQ)

From: DeBiasi, Deborah (DEQ)
Sent: Monday, May 23, 2011 10:58 AM
To: Carpenter, Emilee (DEQ)
Subject: RE: VA0003077: DuPont Teijin: WET Evaluation

I agree that one organism, the *Ceriodaphnia dubia*, will be sufficient for compliance testing in this permit cycle. Should anything change that would affect the effluent characteristics, acute tests with *Pimephales promelas* should resume in addition to the acute tests with *C. dubia*.

Deborah L. DeBiasi, Virginia DEQ
Office of Water Permit and Compliance Assistance Programs
Email: **Deborah.DeBiasi@deq.virginia.gov**
PH: 804-698-4028

From: Carpenter, Emilee (DEQ)
Sent: Monday, May 23, 2011 10:50 AM
To: DeBiasi, Deborah (DEQ)
Subject: FW: VA0003077: DuPont Teijin: WET Evaluation

Hi Deborah-

As discussed last week, DuPont Teijin requested that we remove the requirement to continue monitoring acute toxicity for Pimephales promelas. As we discussed there was only one sample that showed less than 100% survival in 100% effluent, which came in at 95% survival. Because the 95% survival result does not indicate toxicity, we agreed that the sampling could be discontinued.

Can you please confirm your support in a response to this email?

Thanks,

Emilee C. Carpenter
Water Permit Writer, Senior
Piedmont Regional Office
Department of Environmental Quality

emilee.carpenter@deq.virginia.gov
t: 804/527-5072
f: 804/527-5106

From: DeBiasi, Deborah (DEQ)
Sent: Tuesday, January 25, 2011 3:14 PM
To: Carpenter, Emilee (DEQ)
Subject: RE: VA0003077: DuPont Teijin: WET Evaluation

Hi, Emily! I'd suggest a couple of tweaks to the WET special condition but every thing else looks good.

1. You don't want to have a dilution series in the permit for monitoring. You can suggest that series in the fact sheet, or just to the permittee, but it should be up to them and/or the lab to determine what to use. It isn't that critical for them to do a lot of adjusting with the acute test dilution series since the result is calculated by interpolation (of sorts) between the dilutions used.

2. I've attached an example boilerplate WET condition with formatting that could work for this situation. The language about how to convert the LC50 to a TU is in there too.

Deborah L. DeBiasi, Virginia DEQ
Office of Water Permit and Compliance Assistance Programs
Email: **Deborah.DeBiasi@deq.virginia.gov**
PH: 804-698-4028

From: Carpenter, Emilee (DEQ)
Sent: Tuesday, January 25, 2011 12:06 PM
To: DeBiasi, Deborah (DEQ)
Subject: VA0003077: DuPont Teijin: WET Evaluation

Hi Deborah-

Attached for your review is the WET testing evaluation and proposed permit language for the subject permit reissuance. Please let me know if you have any comments or questions.

Thanks.

Emilee C. Carpenter
Water Permit Writer, Senior
Piedmont Regional Office
Department of Environmental Quality

emilee.carpenter@deq.virginia.gov
t: 804/527-5072
f: 804/527-5106

Carpenter, Emilee (DEQ)

From: DeBiasi, Deborah (DEQ)
Sent: Tuesday, February 01, 2011 4:10 PM
To: Carpenter, Emilee (DEQ)
Subject: RE: VA0003077: DuPont Teijin: WET Evaluation

Looks good to me! Thanks for sending it.

Deborah L. DeBiasi, Virginia DEQ
Office of Water Permit and Compliance Assistance Programs
Email: Deborah.DeBiasi@deq.virginia.gov
PH: 804-698-4028

From: Carpenter, Emilee (DEQ)
Sent: Tuesday, February 01, 2011 12:52 PM
To: DeBiasi, Deborah (DEQ)
Subject: RE: VA0003077: DuPont Teijin: WET Evaluation

Hi Deborah-

Thank you for the quick review. I have made the recommended changes and attached the revised WET Memo. Please let me know if you concur.

Thanks!

Emilee C. Carpenter
Water Permit Writer, Senior
Piedmont Regional Office
Department of Environmental Quality

emilee.carpenter@deq.virginia.gov
t: 804/527-5072
f: 804/527-5106

From: DeBiasi, Deborah (DEQ)
Sent: Tuesday, January 25, 2011 3:14 PM
To: Carpenter, Emilee (DEQ)
Subject: RE: VA0003077: DuPont Teijin: WET Evaluation

Hi, Emily! I'd suggest a couple of tweaks to the WET special condition but every thing else looks good.

1. You don't want to have a dilution series in the permit for monitoring. You can suggest that series in the fact sheet, or just to the permittee, but it should be up to them and/or the lab to determine what to use. It isn't that critical for them to do a lot of adjusting with the acute test dilution series since the result is calculated by interpolation (of sorts) between the dilutions used.

2. I've attached an example boilerplate WET condition with formatting that could work for this situation. The language about how to convert the LC50 to a TU is in there too.

Deborah L. DeBiasi, Virginia DEQ
Office of Water Permit and Compliance Assistance Programs

Email: Deborah.DeBiasi@deq.virginia.gov
PH: 804-698-4028

From: Carpenter, Emilee (DEQ)
Sent: Tuesday, January 25, 2011 12:06 PM
To: DeBiasi, Deborah (DEQ)
Subject: VA0003077: DuPont Teijin: WET Evaluation

Hi Deborah-

Attached for your review is the WET testing evaluation and proposed permit language for the subject permit reissuance. Please let me know if you have any comments or questions.

Thanks.

Emilee C. Carpenter
Water Permit Writer, Senior
Piedmont Regional Office
Department of Environmental Quality

emilee.carpenter@deq.virginia.gov
t: 804/527-5072
f: 804/527-5106

Carpenter, Emilee (DEQ)

From: Carpenter, Emilee (DEQ)
Sent: Wednesday, June 22, 2011 5:12 PM
To: DeBiasi, Deborah (DEQ)
Subject: RE: Response to Revised Draft Permit

Hey Deborah-

Thanks for the quick feedback. I apologize it's taken me so long to get back with you. It's been a few of those head-spinner weeks.

I really appreciate you offering flexibility on boiler plate language. For some reason, DuPont legal staff is really picking this draft apart and I need some room to flex. The part about statistical evaluation of the data is included, so I will go ahead and change the language as requested to: " The test dilutions should be able to ~~determine compliance with~~ asses effluent toxicity at an acute LC50 = 5% equivalent to a TUa = 20."

As for the reference to a 96 hour Pimephales promelas test, I have no idea what they are talking about. The permit makes no reference to a 96 hour test. I suspect they were pulling from their own memory banks on that one. I have asked that they direct me specifically to the 96 hour test in the draft permit just in case. We will see.

Thanks again,

Emilee C. Carpenter
Water Permit Writer, Senior
Piedmont Regional Office
Department of Environmental Quality

emilee.carpenter@deq.virginia.gov
t: 804/527-5072
f: 804/527-5106

From: DeBiasi, Deborah (DEQ)
Sent: Wednesday, June 08, 2011 3:46 PM
To: Carpenter, Emilee (DEQ)
Subject: RE: Response to Revised Draft Permit

I'd prefer that the language stay "as is" since it is boiler plate language that goes in all the permits there, but if you need to acquiesce on something, you could allow it if the special condition still has the part about the data will be evaluated statistically…

Curious about the stormwater testing. Why is a 96 hour P.promelas in there? We haven't used that test in 15 years.

Deborah L. DeBiasi, Virginia DEQ
Office of Water Permit and Compliance Assistance Programs
Email: **Deborah.DeBiasi@deq.virginia.gov**
PH: 804-698-4028

From: Carpenter, Emilee (DEQ)
Sent: Wednesday, June 08, 2011 3:23 PM
To: DeBiasi, Deborah (DEQ)
Subject: FW: Response to Revised Draft Permit

Hi Deborah-

How do you feel about the second request?

Thanks.I

Emilee C. Carpenter
Water Permit Writer, Senior
Piedmont Regional Office
Department of Environmental Quality

emilee.carpenter@deq.virginia.gov
t: 804/527-5072
f: 804/527-5106

From: Marianne R Andrews [mailto:Marianne.R.Andrews@usa.dupont.com]
Sent: Wednesday, June 08, 2011 3:14 PM
To: Carpenter, Emilee (DEQ)
Cc: J Bart Ruiter
Subject: Response to Revised Draft Permit

Emilee,

Please see our comments, attached. A hard copy of this letter is also being sent to you today.

Thanks,
Marianne

Virginia DEQ
Deborah L. DeBiasi
804-698-4028 dldebiasi@deq.virginia.gov

Spreadsheet for determination of WET test endpoints or WET limits

Excel 97
Revision Date: 01/10/05
File: WETLIM10.xls
(MIX.EXE required also)

Enter data in the cells with blue type:

Entry Date:	01/24/11
Facility Name:	duPont- Teijin
VPDES Number:	VA0003077
Outfall Number:	1

Acute Endpoint/Permit Limit — **Use as LC_{50} in Special Condition, as TUa on DMR**

ACUTE 24.99900061 TUa — LC_{50} = 5 % Use as 20.00 TUa

ACUTE WLAa 24.999

Note: Inform the permittee that if the mean of the data exceeds this TUa: 7.02405354 a limit may result using WLA.EXE

Chronic Endpoint/Permit Limit — **Use as NOEC in Special Condition, as TUc on DMR**

CHRONIC	249.9900061	TU_c	NOEC =	1	% Use as	100.00	TU_c
BOTH*	249.9900061	TU_c	NOEC =	1	% Use as	100.00	TU_c
AML	249.9900061	TU_c	NOEC =	1	% Use as	100.00	TU_c

ACUTE WLAa,c 249.99
CHRONIC WLAc 625
* Both means acute expressed as chronic

Note: Inform the permittee that if the mean of the data exceeds this TUc: 102.732061 a limit may result using WLA.EXE

% Flow to be used from MIX.EXE

Plant Flow:	1	MGD	
Acute 1Q10:	83.33	MGD	100 %
Chronic 7Q10:	625	MGD	100 %

Difuser /modeling study?

Enter Y/N Y

Acute	83.33	:1
Chronic	625	:1

Are data available to calculate CV? (Y/N) N (Minimum of 10 data points, same species, needed) Go to Page 2

Are data available to calculate ACR? (Y/N) N (NOEC<LC50, do not use greater/less than data) Go to Page 3

NOTE: If the IWCa is >33%, specify the NOAEC = 100% test/endpoint for use

IWC_a	1.200048002	%	Plant flow/plant flow + 1Q10
IWC_c	0.16	%	Plant flow/plant flow + 7Q10
Dilution, acute	83.33		100/IWCa
Dilution, chronic	625		100/IWCc
WLA_a	24.999		Instream criterion (0.3 TUa) X's Dilution, acute
WLA_c	625		Instream criterion (1.0 TUc) X's Dilution, chronic
$WLA_{a,c}$	249.99		ACR X's WLA_a - converts acute WLA to chronic units
ACR -acute/chronic ratio	10		LC50/NOEC (Default is 10 - if data are available, use tables Page 3)
CV-Coefficient of variation	0.6		Default of 0.6 - if data are available, use tables Page 2)
Constants eA	0.4109447		Default = 0.41
eB	0.6010373		Default = 0.60
eC	2.4334175		Default = 2.43
eD	2.4334175		Default = 2.43 (1 samp)

No. of samples 1

****The Maximum Daily Limit is calculated from the lowest LTA, X's eC. The LTAa,c and MDL using it are driven by the ACR.**

$LTA_{a,c}$	102.7320656		WLAa,c X's eA					
LTA_c	375.6483125		WLAc X's eB				Rounded NOEC's	%
MDL** with $LTA_{a,c}$	249.9900061	TU_c	NOEC =	0.400016	(Protects from acute/chronic toxicity)		NOEC = 1	%
MDL** with LTA_c	914.1091775	TU_c	NOEC =	0.109396	(Protects from chronic toxicity)		NOEC = 1	%
AML with lowest LTA	249.9900061	TU_c	NOEC =	0.400016	Lowest LTA X's eD		NOEC = 1	

IF ONLY ACUTE ENDPOINT/LIMIT IS NEEDED, CONVERT MDL FROM TU_c to TU_a

						Rounded LC50's	%
MDL with $LTA_{a,c}$	24.99900061	TU_a	LC50 =	4.000160	%	LC50 = 5	%
MDL with LTA_c	91.41091775	TU_a	LC50 =	1.093961	%	LC50 = 2	

Virginia DEQ
Deborah L. DeBiasi
804-698-4028 dldebiasi@deq.virginia.gov

Page 2 - Follow the directions to develop a site specific CV (coefficient of variation)

IF YOU HAVE AT LEAST 10 DATA POINTS THAT ARE QUANTIFIABLE (NOT "<" OR ">") FOR A SPECIES, ENTER THE DATA IN EITHER COLUMN "G" (VERTEBRATE) OR COLUMN "J" (INVERTEBRATE). THE 'CV' WILL BE PICKED UP FOR THE CALCULATIONS BELOW. THE DEFAULT VALUES FOR eA, eB, AND eC WILL CHANGE IF THE 'CV' IS ANYTHING OTHER THAN 0.6.

Coefficient of Variation for effluent tests

CV = 0.6 (Default 0.6)

δ^2 = 0.3074847

δ = 0.554513029

Using the log variance to develop eA
(P. 100, step 2a of TSD)

Z = 1.881 (97% probability stat from table

A = -0.88929666

eA = 0.410944686

Using the log variance to develop eB
(P. 100, step 2b of TSD)

δ_4^2 = 0.086177696

δ_4 = 0.293560379

B = -0.50909823

eB = 0.601037335

Using the log variance to develop eC
(P. 100, step 4a of TSD)

δ^2 = 0.3074847

δ = 0.554513029

C = 0.889296658

eC = 2.433417525

Using the log variance to develop eD
(P. 100, step 4b of TSD)

n = 1 This number will most likely stay as "1", for 1 sample/month.

δ_n^2 = 0.3074847

δ_n = 0.554513029

D = 0.889296658

eD = 2.433417525

	Vertebrate IC_{25} Data or LC_{50} Data	LN of data	Invertebrate IC_{25} Data or LC_{50} Data	LN of data
	**********		**********	
1			1	0
2			2	
3			3	
4			4	
5			5	
6			6	
7			7	
8			8	
9			9	
10			10	
11			11	
12			12	
13			13	
14			14	
15			15	
16			16	
17			17	
18			18	
19			19	
20			20	
St Dev	NEED DATA	NEED DATA	St Dev	NEED DATA	NEED DATA
Mean	0	0	Mean	0	0
Variance	0	0.000000	Variance	0	0.000000
CV	0		CV	0	

Virginia DEQ
Deborah L. DeBiasi
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Page 3 - Follow directions to develop a site specific ACR (Acute to Chronic Ratio)

To determine Acute/Chronic Ratio (ACR), insert usable data below. Usable data is defined as valid paired test results, acute and chronic, tested at the same temperature, same species. The chronic NOEC must be less than the acute LC_{50}, since the ACR divides the LC_{50} by the NOEC. LC_{50}'s >100% should not be used.

Table 1. ACR using Vertebrate data

Set #	LC_{50}	NOEC	Test ACR	Logarithm	Geomean	Antilog	ACR to Use
1	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
2	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
3	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
4	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
5	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
6	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
7	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
8	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
9	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
10	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
				ACR for vertebrate data:			0

Table 1. Result:	Vertebrate ACR	0
Table 2. Result:	Invertebrate ACR	0
	Lowest ACR	Default to 10

Table 2. ACR using Invertebrate data

Set #	LC_{50}	NOEC	Test ACR	Logarithm	Geomean	Antilog	ACR to Use
1	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
2	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
3	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
4	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
5	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
6	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
7	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
8	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
9	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
10	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
				ACR for vertebrate data:			0

Convert LC_{50}'s and NOEC's to Chronic TU's for use in WLA.EXE

Table 3. **ACR used:** 10

	Enter LC_{50}	TUc	Enter NOEC	TUc
1		NO DATA		NO DATA
2		NO DATA		NO DATA
3		NO DATA		NO DATA
4		NO DATA		NO DATA
5		NO DATA		NO DATA
6		NO DATA		NO DATA
7		NO DATA		NO DATA
8		NO DATA		NO DATA
9		NO DATA		NO DATA
10		NO DATA		NO DATA
11		NO DATA		NO DATA
12		NO DATA		NO DATA
13		NO DATA		NO DATA
14		NO DATA		NO DATA
15		NO DATA		NO DATA
16		NO DATA		NO DATA
17		NO DATA		NO DATA
18		NO DATA		NO DATA
19		NO DATA		NO DATA
20		NO DATA		NO DATA

If WLA.EXE determines that an acute limit is needed, you need to convert the TUc answer you get to TUa and then an LC50, enter it here: NO DATA %LC_{50}

NO DATA TUa

DILUTION SERIES TO RECOMMEND

Table 4.

	Monitoring		Limit	
	% Effluent	TUc	% Effluent	TUc
Dilution series based on data mean	1.0	102.7321		
Dilution series to use for limit			1	100
Dilution factor to recommend:	0.0986613		0.1	
Dilution series to recommend:	100.0	1.00	100.0	1.00
	9.9	10.14	10.0	10.00
	1.0	102.73	1.0	100.00
	0.1	1041.26	0.1	1000.00
	0.01	10553.88	0.0	10000.00
Extra dilutions if needed	0.00	106970.74	0.0	100000.00
	0.00	########	0.0	##########

Virginia DEQ
Deborah L. DeBiasi
804-698-4028 dldebiasi@deq.virginia.gov

Cell: I9
Comment:
This is assuming that the data are Type 2 data (none of the data in the data set are censored - "<" or ">").

Cell: K18
Comment: This is assuming that the data are Type 2 data (none of the data in the data set are censored - "<" or ">").

Cell: J22
Comment: Remember to change the "N" to "Y" if you have ratios entered, otherwise, they won't be used in the calculations.

Cell: C40
Comment:
If you have entered data to calculate an ACR on page 3, and this is still defaulted to "10", make sure you have selected "Y" in cell E21

Cell: C41
Comment: If you have entered data to calculate an effluent specific CV on page 2, and this is still defaulted to "0.6", make sure you have selected "Y" in cell E20

Cell: L48
Comment:
See Row 151 for the appropriate dilution series to use for these NOEC's

Cell: G62
Comment:
Vertebrates are:
Pimephales promelas
Oncorhynchus mykiss
Cyprinodon variegatus

Cell: J62
Comment:
Invertebrates are:
Ceriodaphnia dubia
Mysidopsis bahia

Cell: C117
Comment: Vertebrates are:

Pimephales promelas
Cyprinodon variegatus

Cell: M119
Comment: The ACR has been picked up from cell C34 on Page 1. If you have paired data to calculate an ACR, enter it in the tables to the left, and make sure you have a "Y" in cell E21 on Page 1. Otherwise, the default of 10 will be used to convert your acute data.

Cell: M121
Comment: If you are only concerned with acute data, you can enter it in the NOEC column for conversion and the number calculated will be equivalent to the TUa. The calculation is the same: 100/NOEC = TUc or 100/LC50 = TUa.

Cell: C138
Comment: Invertebrates are:

Ceriodaphnia dubia
Mysidopsis bahia

1/19/2011 8:56:58 AM

Facility = duPont-Teijin
Chemical = TUa
Chronic averaging period = 4
WLAa = 20
WLAc = N/A
Q.L. = 1
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 5
Expected Value =
Variance =
C.V. =
97th percentile daily values =
97th percentile 4 day average =
97th percentile 30 day average=
< Q.L. = 0
Model used =

No Limit is required for this material

The data are:

1
14
1.7
1.8
1

The data in this analysis are expressed in acute toxicity units (TUa).

ATTACHMENT H

NPDES Permit Rating Worksheet

NPDES PERMIT RATING WORK SHEET

☐ Regular Addition
☐ DiscretionaryAddition
☐ Score change, but no status change
☐ Deletion

NPDES NO. VA0003077

Facility Name: DuPont Teijin Films

City: Chesterfield County

Receiving Water: James River

Reach Number:

Is this facility a steam electric power plant (SIC=4911) with one or more of the following characteristics?		*Is this permit for a municipal separate storm sewer serving a population greater than 100,000?*
1. Power output 500 MW or greater (not using a cooling pond/lake) 2. A nuclear power plant 3. Cooling water discharge greater than 25% of the receiving stream's 7Q10 flow rate ☐ YES; score is 600 (stop here) ☒ NO (continue)		☐ YES; score is 700 (stop here) ☒ NO (continue)

FACTOR 1: Toxic Pollutant Potential

PCS SIC Code: Primary SIC Code: 3081 Other SIC Codes: 2821
Industrial Subcategory Code: (Code 000 if no subcategory)

Determine the Toxicity potential from Appendix A. Be sure to use the TOTAL toxicity potential column and check one)

Toxicity Group	Code	Points	Toxicity Group	Code	Points	Toxicity Group	Code	Points
☐ No process waste streams	0	0	☐ 3.	3	15	☐ 7.	7	35
☐ 1.	1	5	☐ 4.	4	20	☐ 8.	8	40
☐ 2.	2	10	☐ 5.	5	25	☒ 9.	9	45
			☐ 6.	6	30	☐ 10.	10	50

Code Number Checked: 9

Total Points Factor 1: 45

FACTOR 2: Flow/Stream Flow Volume (*Complete either Section A or Section B; check only one)*

Section A ? Wastewater Flow Only Considered

Wastewater Type (See Instructions)		Code	Points
Type I: Flow < 5 MGD	☐	11	0
Flow 5 to 10 MGD	☐	12	10
Flow > 10 to 50 MGD	☐	13	20
Flow > 50 MGD	☐	14	30
Type II: Flow < 1 MGD	☐	21	10
Flow 1 to 5 MGD	☐	22	20
Flow > 5 to 10 MGD	☐	23	30
Flow > 10 MGD	☐	24	50
Type III: Flow < 1 MGD	☐	31	0
Flow 1 to 5 MGD	☐	32	10
Flow > 5 to 10 MGD	☐	33	20
Flow > 10 MGD	☐	34	30

Section B ? Wastewater and Stream Flow Considered

Wastewater Type (See Instructions)	Percent of instream Wastewater Concentration at Receiving Stream Low Flow		Code	Points
Type I/III:	< 10 %	☐	41	0
	10 % to < 50 %	☐	42	10
	> 50 %	☐	43	20
Type II:	< 10 %	☒	51	0
	10 % to <50 %	☐	52	20
	> 50 %	☐	53	30

Code Checked from Section A or B: 51

Total Points Factor 2: 0

FACTOR 3: Conventional Pollutants

(only when limited by the permit)

A. Oxygen Demanding Pollutant: (check one) ☐ BOD ☐ COD ☒ Other: CBOD5

Permit Limits: (check one)		Code	Points
	< 100 lbs/day	1	0
☒	100 to 1000 lbs/day	2	5
☐	> 1000 to 3000 lbs/day	3	15
☐	> 3000 lbs/day	4	20

Code Checked: 2

Points Scored: 5

B. Total Suspended Solids (TSS)

Permit Limits: (check one)		Code	Points
☐	< 100 lbs/day	1	0
☒	100 to 1000 lbs/day	2	5
☐	> 1000 to 5000 lbs/day	3	15
☐	> 5000 lbs/day	4	20

Code Checked: 2

Points Scored: 5

C. Nitrogen Pollutant: (check one) ☒ Ammonia ☐ Other: _____

Permit Limits: (check one)		*Nitrogen Equivalent*	*Code*	*Points:*
☒	< 300 lbs/day	1		0
☐	300 to 1000 lbs/day	2		5
☐	> 1000 to 3000 lbs/day	3		15
☐	> 3000 lbs/day	4		20

Code Checked: 1

Points Scored: 0

Total Points Factor 3: 10

FACTOR 4: Public Health Impact

Is there a public drinking water supply located within 50 miles downstream of the effluent discharge (this includes any body of water to which the receiving water is a tributary)? A public drinking water supply may include infiltration galleries, or other methods of conveyance that ultimately get water from the above referenced supply.

☒ YES (If yes, check toxicity potential number below)

☐ NO (If no, go to Factor 5)

Determine the *human health* toxicity potential from Appendix A. Use the same SIC code and subcategory reference as in Factor 1. (Be sure to use the human health toxicity group column ? check one below)

Toxicity Group	Code	Points	Toxicity Group	Code	Points	Toxicity Group	Code	Points
☐ No process waste streams	0	0	☐ 3.	3	0	☐ 7.	7	15
☐ 1.	1	0	☐ 4.	4	0	☒ 8.	8	20
☐ 2.	2	0	☐ 5.	5	5	☐ 9.	9	25
			☐ 6.	6	10	☐ 10.	10	30

Code Number Checked: 8

Total Points Factor 4: 20

FACTOR 5: Water Quality Factors

A. Is (or will) one or more of the effluent discharge limits based on water quality factors of the receiving stream (rather than technology-based federal effluent guidelines, or technology-based state effluent guidelines), or has a wasteload allocation been assigned to the discharge:

		Code	Points
☒	Yes	1	10
☐	No	2	0

B. Is the receiving water in compliance with applicable water quality standards for pollutants that are water quality limited in the permit?

		Code	Points
☐	Yes	1	0
☒	No	2	5

C. Does the effluent discharged from this facility exhibit the reasonable potential to violate water quality standards due to whole effluent toxicity?

		Code	Points
☐	Yes	1	10
☒	No	2	0

Code Number Checked: A 1 B 2 C 2

Points Factor 5: A 10 + B 5 + C 0 = **15** TOTAL

FACTOR 6: Proximity to Near Coastal Waters

A. Base Score: Enter flow code here (from Factor 2): 51

Enter the multiplication factor that corresponds to the flow code: 0.10

Check appropriate facility HPRI Code (from PCS):

	HPRI#	*Code*	*HPRI Score*
☐	1	1	20
☐	2	2	0
☒	3	3	30
☐	4	4	0
☐	5	5	20

HPRI code checked: 3

Flow Code	*Multiplication Factor*
11, 31, or 41	0.00
12, 32, or 42	0.05
13, 33, or 43	0.10
14 or 34	0.15
21 or 51	0.10
22 or 52	0.30
23 or 53	0.60
24	1.00

Base Score: (HPRI Score) 30 X (Multiplication Factor) 0.10 = **3** (TOTAL POINTS)

B. Additional Points ☐ *NEP Program*
For a facility that has an HPRI code of 3, does the facility discharge to one of the estuaries enrolled in the National Estuary Protection (NEP) program (see instructions) or the Chesapeake Bay?

	Code	Points
☒ Yes	1	10
☐ No	2	0

C. Additional Points ☐ *Great Lakes Area of Concern*
For a facility that has an HPRI code of 5, does the facility discharge any of the pollutants of concern into one of the Great Lakes' 31 areas of concern (see Instructions)

	Code	Points
☐ Yes	1	10
☒ No	2	0

Code Number Checked: A 4 B 2 C 2

Points Factor 6: A 3 + B 10 + C 0 = **13** TOTAL

SCORE SUMMARY

Factor	Description	Total Points
1	Toxic Pollutant Potential	45
2	Flows/Streamflow Volume	0
3	Conventional Pollutants	10
4	Public Health Impacts	20
5	Water Quality Factors	15
6	Proximity to Near Coastal Waters	13
	TOTAL (Factors 1 through 6)	103

S1. Is the total score equal to or greater than 80? ☒ Yes (Facility is a major) ☐ No

S2. If the answer to the above questions is no, would you like this facility to be discretionary major?

☐ No

☐ Yes (Add 500 points to the above score and provide reason below:

Reason:

NEW SCORE: 103

OLD SCORE: 93

Emilee Carpenter
Permit Reviewer's Name

(804) 527-5072
Phone Number

1.24.11
Date

ATTACHMENT I

T&E Species Screening

Department of Conservation & Recreation
CONSERVING VIRGINIA'S NATURAL & RECREATIONAL RESOURCES

WebID: W634314872421562500

Client Project Number: VA0003077

PROJECT INFORMATION

TITLE: DuPont Teijin Films

DESCRIPTION: Polyester Resin and Film Manufacturer; discharges process water, sanitary wastewater, and storm water

EXISTING SITE CONDITIONS: Normal; extended aeration treatment plants for sanitary and industrial WW

QUADRANGLES: HOPEWELL

COUNTIES: Chesterfield,Henrico

Latitude/Longitude (DMS): 372112/771730

Acreage: 269

Comments: None

REQUESTOR INFORMATION

Priority: No Tier Level: 2 Tax ID:

Contact Name: Emilee Carpenter

Company Name: DEQ-Piedmont Regional Office

Address: 4949-A Cox Road

City: Glen Allen State: VA Zip: 23060

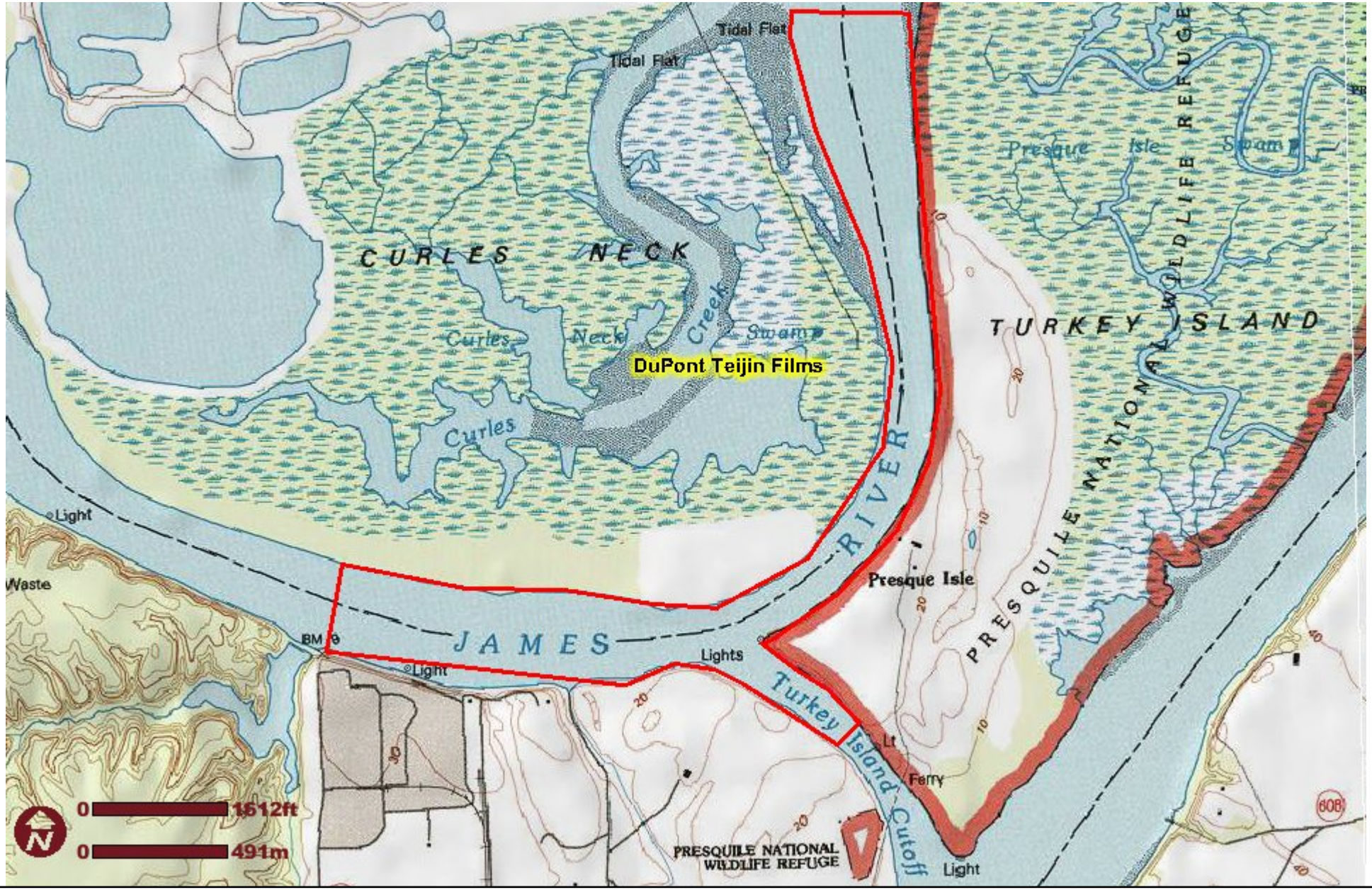
Phone: 8045275072 Fax: 8045275106 Email: emilee.carpenter@deq.virginia.gov

Conservation Site Name	Site Type	Brank	Acreage	Listed Species Presence
	GLNHR			NL
	GLNHR			NL
	GLNHR			NL
	GLNHR			FL
JOHNSON CREEK HABITAT ZONE	Conservation Site	B5	238	SL
BERMUDA HUNDRED HABITAT ZONE	Conservation Site	B5	195	SL
EPPES ISLAND HABITAT ZONE	Conservation Site	B5	195	SL
EPPES CREEK HABITAT ZONE	Conservation Site	B5	195	SL
JAMES RIVER HABITAT ZONE	Conservation Site	B5	195	SL
TURKEY ISLAND CUTOFF	Conservation Site	B5	195	SL
HARDENS BLUFF HABITAT ZONE	Conservation Site	B5	238	SL
CURLES NECK	Conservation Site	B3	5,103	FL

Natural Heritage Conservation Sites within Search Radius

Site-Name	Group-Name	common-name	scientific-name	GRANK	SRANK	Fed Status	st status	EO Rank	last obs date	precision
	Invertebrate Animal	Ohio River Shrimp	Macrobrachium ohione	G4	S1			H	1952-04-16	M
	Vascular Plant	Water-plantain Spearwort	Ranunculus ambigens	G4	S1			H	1935-06-26	
	Vertebrate Animal	Atlantic Sturgeon	Acipenser oxyrinchus	G3	S2	C	SC	E	2007	
	Vertebrate Animal	Northern Harrier	Circus cyaneus	G5	S1S2B,S3N		SC	E	1992	
BERMUDA HUNDRED HABITAT ZONE	Vertebrate Animal	Bald Eagle	Haliaeetus leucocephalus	G5	S2S3B,S3N		LT	E	1999-	S
CURLES NECK	Vascular Plant	Sensitive Joint-vetch	Aeschynomene virginica	G2	S2	LT	LT	C?	2001-09-12	S
CURLES NECK	Vertebrate Animal	Bald Eagle	Haliaeetus leucocephalus	G5	S2S3B,S3N		LT	E	2002-	S
CURLES NECK	Vertebrate Animal	Bald Eagle	Haliaeetus leucocephalus	G5	S2S3B,S3N		LT	E	2002-	S
HARDENS BLUFF HABITAT ZONE	Vertebrate Animal	Bald Eagle	Haliaeetus leucocephalus	G5	S2S3B,S3N		LT	D	2002-	S
JAMES RIVER HABITAT ZONE	Vertebrate Animal	Bald Eagle	Haliaeetus leucocephalus	G5	S2S3B,S3N		LT	E	2002-	
TURKEY ISLAND CUTOFF	Vertebrate Animal	Bald Eagle	Haliaeetus leucocephalus	G5	S2S3B,S3N		LT	E	2002-	

Natural Heritage Resources within Search Radius



Quads: HOPEWELL

Counties: Chesterfield,Henrico

DuPont Teijin Films

Company: DEQ-Piedmont Regional Office

Lat/Long: 372112/771730

Douglas W. Domenech
Secretary of Natural Resources

David A. Johnson
Director

COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION

The project mapped as part of this report has been searched against the Department of Conservation and Recreation's Biotics Data System for occurrences of natural heritage resources from the area indicated for this project. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

According to the information currently in Biotics files, NATURAL HERITAGE RESOURCES HAVE BEEN DOCUMENTED within two miles of the indicated project boundaries.

You have submitted this project to DCR for a more detailed review for potential impacts to natural heritage resources. DCR will review the submitted project to identify the specific natural heritage resources in the vicinity of the proposed project. Using the expertise of our biologists, DCR will evaluate whether your specific project is likely to impact these resources, and if so how. DCR's response will indicate whether any negative impacts are likely and, if so, make recommendations to avoid, minimize and/or mitigate these impacts. If the potential negative impacts are to species that are state- or federally-listed as threatened or endangered, DCR will also recommend coordination with the appropriate regulatory agencies: the Virginia Department of Game and Inland Fisheries for state-listed animals, the Virginia Department of Agriculture and Consumer Services for state-listed plants and insects, and the United States Fish and Wildlife Service for federally listed plants and animals. If your project is expected to have positive impacts we will report those to you with recommendations for enhancing these benefits.

Please allow up to 30 days for a response.

We will review the project based on the information you included in the Project Info submittal form, which is included in the report that follows. Often additional information can help us make a more accurate and detailed assessment of a project's potential impacts to natural heritage resources. If you have additional information that you believe will help us better assess your project's potential impacts, you may send that information to us. Please refer to the project Title (from the first page of this report) and include this pdf file with any additional information you send us.

Thank you for submitting your project for review to the Virginia Natural Heritage Program through the NH Data Explorer. Should you have any questions or concerns about DCR, the Data Explorer, or this report, please contact the Natural Heritage Project Review Unit at 804-371-2708.
its.

Douglas W. Domenech
Secretary of Natural Resources

David A. Johnson
Director

COMMONWEALTH of VIRGINIA
DEPARTMENT OF CONSERVATION AND RECREATION
Division of Natural Heritage
217 Governor Street
Richmond, Virginia 23219-2010
(804) 786-7951

February 15, 2011

Emilee Carpenter
DEQ – Piedmont Regional Office
4949-A Cox Road
Glen Allen, VA 23060

Re: VA0003077, Dupont Teijin Films

Dear Ms. Carpenter:

The Department of Conservation and Recreation's Division of Natural Heritage (DCR) has searched its Biotics Data System for occurrences of natural heritage resources from the area outlined on the submitted map. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

According to the information currently in our files, this site is located within the Curles Neck Conservation Site. Conservation sites are tools for representing key areas of the landscape that warrant further review for possible conservation action because of the natural heritage resources and habitat they support. Conservation sites are polygons built around one or more rare plant, animal, or natural community designed to include the element and, where possible, its associated habitat, and buffer or other adjacent land thought necessary for the element's conservation. Conservation sites are given a biodiversity significance ranking based on the rarity, quality, and number of element occurrences they contain; on a scale of 1-5, 1 being most significant. Curles Neck Conservation Site has been given a biodiversity significance ranking of B3, which represents a site of high significance. The natural heritage resource of concern at this site is:

Haliaeetus leucocephalus	Bald eagle (concentration area)	G5/S2S3B,S3N/NL/LT

The Bald eagle breeds from Alaska eastward through Canada and the Great Lakes region, along coastal areas off the Pacific and Atlantic Oceans, and the Gulf of Mexico, and in pockets throughout the western United States (NatureServe, 2009). In Virginia, it primarily breeds along the large Atlantic slope rivers (James, Rappahannock, Potomac, etc) with a few records at inland sites near large reservoirs (Byrd, 1991). Bald eagle nest sites are often found in the midst of large wooded areas near marshes or other bodies of water (Byrd, 1991). Bald eagles feed on fish, waterfowl, seabirds (Campbell et. al., 1990), various mammals and carrion (Terres, 1980). Please note that this species is currently classified as threatened by the Virginia Department of Game and Inland Fisheries (VDGIF).

Threats to this species include human disturbance of nest sites (Byrd, 1991), habitat loss, biocide contamination, decreasing food supply and illegal shooting (Herkert, 1992).

Due to the legal status of the Bald eagle, DCR recommends coordination with the VDGIF in order to ensure compliance with protected species legislation.

In addition, Atlantic Sturgeon (*Acipenser oxyrinchus,* G3/S2/NL/NL) has been documented in the project vicinity. Atlantic Sturgeon is a large fish that reaches a maximum length of about 4.3 meters. They spawn as early as February-March in the south, April-May in Chesapeake Bay tributaries. Adults migrate between fresh water spawning areas and salt water nonspawning areas. They make extensive coastal migrations; and, may move up to 1500 km along coast from spawning rivers. Their habitat is primarily marine, but close to shore, when not breeding; and, migrates to rivers for spawning, moving downstream afterward (may stay upstream in winter in some northern areas). Juveniles spend winter and spring mainly in river mouths. In some rivers, juveniles may spend several years continuously in freshwater; in others, they may move downstream to brackish water when temperatures drop in the fall (Hoff 1980). They spawn in fresh water (sometimes tidal) usually over a bottom of hard clay, rubble, gravel, or shell, or may spawn in brackish water. (NatureServe, Feb., 2011)

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the Virginia Department of Conservation and Recreation (DCR), DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species. The current activity will not affect any documented state-listed plants or insects.

Our files do not indicate the presence of any State Natural Area Preserves under DCR's jurisdiction in the project vicinity.

New and updated information is continually added to Biotics. Please contact DCR for an update on this natural heritage information if a significant amount of time passes before it is utilized.

The Virginia Department of Game and Inland Fisheries maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters that may contain information not documented in this letter. Their database may be accessed from http://vafwis.org/fwis/ or contact Shirl Dressler at (804) 367-6913.

Should you have any questions or concerns, feel free to contact me at 804-692-0984. Thank you for the opportunity to comment on this project.

Sincerely,

Alli Baird

Alli Baird, LA, ASLA
Coastal Zone Locality Liaison

CC: Amy Ewing, VDGIF

Literature Cited

Byrd, M.A. 1991. Bald eagle. In Virginia's Endangered Species: Proceedings of a Symposium. K. Terwilliger ed. The McDonald and Woodward Publishing Company, Blacksburg, Virginia. Pp. 499-501.

Campbell, R.W., N.K. Dawe, I. McTaggart-Cowan, J.M. Cooper, G.W. Kaiser, and M.C.E. McNall. 1990. The Birds of British Columbia. Vol. 1. Nonpasserines: Introduction and loons through waterfowl. Royal British Columbia Museum, Victoria, British Columbia, Canada.

Herkert, J. R., editor. 1992. Endangered and threatened species of Illinois: status and distribution. Vol. 2: Animals. Illinois Endangered Species Protection Board. iv + 142 pp.

NatureServe. 2009. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available http://www.natureserve.org/explorer. (Accessed: June 24, 2010)

NatureServe. 2010. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available http://www.natureserve.org/explorer. (Accessed: February 15, 2011).

Terres, J.K. 1980. The Audubon Society encyclopedia of North American birds. Alfred A. Knopf, New York.

Carpenter, Emilee (DEQ)

From: Carpenter, Emilee (DEQ)
Sent: Monday, February 14, 2011 8:25 AM
To: Baird, Alice (DCR)
Cc: Daub, Elleanore (DEQ)
Subject: 59592-- VA0003077, Dupont Teijin Films T&E review

Ms. Baird,

Thank you for your expedited review and your comments regarding the reissuance of VA0003077, DuPont Teijin Films. Please note this permit action is a reissuance, not an issuance of this permit. The facility has been there for many years and the site footprint is not being expanded, nor is any new activity taking place. Therefore, the reissuance of this permit is not expected to pose any new impacts to the state threatened bald eagle population at or near Curles Neck Conservation Site. Furthermore, the permit is written to protect aquatic life and thereby should not contribute to any loss in food supply. For this reason and the reason that it's not part of the agency's coordination agreement on aquatic species, DEQ will not follow up on your recommendation to further coordinate with the Virginia Department of Game and Inland Fisheries.

Sincerely,

Emilee C. Carpenter
Water Permit Writer, Senior
Piedmont Regional Office
Department of Environmental Quality

emilee.carpenter@deq.virginia.gov
t: 804/527-5072
f: 804/527-5106

From: nhreview (DCR)
Sent: Thursday, February 10, 2011 3:38 PM
To: Carpenter, Emilee (DEQ)
Cc: ProjectReview (DGIF)
Subject: VA0003077, Dupont Teijin Films

Ms. Carpenter,

Please find attached the DCR-DNH comments for the above referenced project. The comments are in pdf format and can be printed for your records. Also species rank information is available at http://www.dcr.virginia.gov/natural_heritage/help.shtml for your reference.

Please note an updated information services order form is located on the Natural Heritage website at: http://dcrintra2.dcr.virginia.gov/dcr/humanresources/leave/NHServiceFormNF.cfm

Please send a confirmation e-mail upon receipt of our comments. Let us know if you have any questions.

Thank you for your request.

Alli Baird, LA, ASLA
Coastal Zone Locality Liaison
DCR- Natural Heritage
217 Governor Street
Richmond, VA 23219
804-692-0984

ATTACHMENT J

OCPSF Guidelines (40 CFR 414 D & I)

[Code of Federal Regulations]
[Title 40, Volume 28]
[Revised as of July 1, 2009]
From the U.S. Government Printing Office via GPO Access
[CITE: 40CFR414]

[Page 228-230]

TITLE 40--PROTECTION OF ENVIRONMENT

CHAPTER I--ENVIRONMENTAL PROTECTION AGENCY (CONTINUED)

PART 414_ORGANIC CHEMICALS, PLASTICS, AND SYNTHETIC FIBERS--
Table of Contents

The provisions of this subpart are applicable to the process wastewater discharges resulting from the manufacture of the products classified under SIC 28213 thermoplastic resins including those resins and resin groups listed below. Product groups are indicated with an asterisk (*).

*Abietic Acid--Derivatives
*ABS Resins
*ABS-SAN Resins
*Acrylate-Methacrylate Latexes
*Acrylic Latex
*Acrylic Resins
*Cellulose Acetate Butyrates
Cellulose Acetate Resin
*Cellulose Acetates
*Cellulose Acetates Propionates
Cellulose Nitrate
*Ethylene-Methacrylic Acid Copolymers
*Ethylene-Vinyl Acetate Copolymers
*Fatty Acid Resins
*Fluorocarbon Polymers
Nylon 11 Resin
*Nylon 6-66 Copolymers
*Nylon 6--Nylon 11 Blends
Nylon 6 Resin
Nylon 612 Resin
Nylon 66 Resin
*Nylons
*Petroleum Hydrocarbon Resins
*Polyvinyl Pyrrolidone--Copolymers
*Poly(Alpha)Olefins
Polyacrylic Acid
*Polyamides
*Polyarylamides
Polybutadiene
*Polybutenes
Polybutenyl Succinic Anhydride

*Polycarbonates
*Polyester Resins
*Polyester Resins, Polybutylene Terephthalate
*Polyester Resins, Polyoxybenzoate
Polyethylene
*Polyethylene--Ethyl Acrylate Resins
*Polyethylene--Polyvinyl Acetate Copolymers
Polyethylene Resin (HDPE)
Polyethylene Resin (LPDE)
Polyethylene Resin, Scrap
Polyethylene Resin, Wax (Low M.W.)
Polyethylene Resin, Latex
Polyethylene Resins
*Polyethylene Resins, Compounded
*Polyethylene, Chlorinated
*Polyimides
*Polypropylene Resins
Polystyrene (Crystal)
Polystyrene (Crystal) Modified
*Polystyrene--Copolymers
*Polystyrene--Acrylic Latexes
Polystyrene Impact Resins
Polystyrene Latex
Polystyrene, Expandable
Polystyrene, Expanded
*Polysulfone Resins
Polyvinyl Acetate
*Polyvinyl Acetate--PVC Copolymers
*Polyvinyl Acetate Copolymers
*Polyvinyl Acetate Resins
Polyvinyl Alcohol Resin
Polyvinyl Chloride
Polyvinyl Chloride, Chlorinated
*Polyvinyl Ether-Maleic Anhydride
*Polyvinyl Formal Resins
*Polyvinylacetate--Methacrylic Copolymers
*Polyvinylacetate Acrylic Copolymers
*Polyvinylacetate-2-Ethylhexylacrylate Copolymers
Polyvinylidene Chloride
*Polyvinylidene Chloride Copolymers
*Polyvinylidene-Vinyl Chloride Resins
*PVC Copolymers, Acrylates (Latex)
*PVC Copolymers, Ethylene-Vinyl Chloride
*Rosin Derivative Resins
*Rosin Modified Resins
*Rosin Resins
*SAN Resins
*Silicones: Silicone Resins
*Silicones: Silicone Rubbers
*Styrene Maleic Anhydride Resins
Styrene Polymeric Residue
*Styrene-Acrylic Copolymer Resins
*Styrene-Acrylonitrile-Acrylates Copolymers
*Styrene-Butadiene Resins
*Styrene-Butadiene Resins (<50% Butadiene)
*Styrene-Butadiene Resins (latex)
*Styrene-Divinyl Benzene Resins (Ion Exchange)

*Styrene-Methacrylate Terpolymer Resins
*Styrene-Methyl Methacrylate Copolymers
*Styrene, Butadiene, Vinyl Toluene Terpolymers
*Sulfonated Styrene-Maleic Anhydride Resins
*Unsaturated Polyester Resins
*Vinyl Toluene Resins
*Vinyl Toluene-Acrylate Resins
*Vinyl Toluene-Butadiene Resins
*Vinyl Toluene-Methacrylate Resins

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*Vinylacetate-N-Butylacrylate Copolymers

[52 FR 42568, Nov. 5, 1987, as amended at 57 FR 41844, Sept. 11, 1992]

Sec. 414.41 Effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT).

Except as provided in 40 CFR 125.30 through 125.32, and in 40 CFR 414.11(i) for point sources with production in two or more subcategories, any existing point source subject to this subpart must achieve discharges not exceeding the quantity (mass) determined by multiplying the process wastewater flow subject to this subpart times the concentration listed in the following table.

Effluent characteristics	BPT Effluent Limitations \1\	
	Maximum for any one day	Maximum for monthly average
BOD5	64	24
TSS	130	40
pH	(\2\)	(\2\)

\1\ All units except pH are milligrams per liter.
\2\ Within the range of 6.0 to 9.0 at all times.

[52 FR 42568, Nov. 5, 1987, as amended at 57 FR 41844, Sept. 11, 1992]

Sec. 414.42 Effluent limitations representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT). [Reserved]

Sec. 414.43 Effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically

achievable (BAT).

(a) The Agency has determined that for existing point sources whose total OCPSF production defined by Sec. 414.11 is less than or equal to five (5) million pounds of OCPSF products per year, the BPT level of treatment is the best available technology economically achievable. Accordingly, the Agency is not promulgating more stringent BAT limitations for these point sources.

(b) Except as provided in paragraph (a) of this section and in 40 CFR 125.30 through 125.32, any existing point source that uses end-of-pipe biological treatment and is subject to this subpart must achieve discharges in accordance with Sec. 414.91 of this part.

(c) Except as provided in paragraph (a) of this section and in 40 CFR 125.30 through 125.32, any existing point source that does not use end-of-pipe biological treatment and is subject to this subpart must achieve discharges in accordance with Sec. 414.101 of this part.

Sec. 414.44 New source performance standards (NSPS).

(a) Any new source that uses end-of-pipe biological treatment and is subject to this subpart must achieve discharges in accordance with Sec. 414.91 of this part, and also must not exceed the quantity (mass) determined by multiplying the process wastewater flow subject to this subpart times the concentrations in the following table.

(b) Any new source that does not use end-of-pipe biological treatment and is subject to this subpart must achieve discharges in accordance with Sec. 414.101 of this part, and also must not exceed the quantity (mass) determined by multiplying the process wastewater flow subject to this subpart times the concentrations in the following table.

Effluent characteristics	NSPS \1\	
	Maximum for any one day	Maximum for monthly average
BOD5	64	24
TSS	130	40
pH	(\2\)	(\2\)

\1\ All units except pH are milligrams per liter.
\2\ Within the range of 6.0 to 9.0 at all times.

Sec. 414.45 Pretreatment standards for existing sources (PSES).

Except as provided in 40 CFR 403.7 and 403.13, any existing source subject to this subpart which introduces pollutants into a publicly owned treatment works must comply with 40 CFR part 403 and achieve discharges in accordance with Sec. 414.111.

[58 FR 36892, July 9, 1993]

[[Page 230]]

Sec. 414.46 Pretreatment standards for new sources (PSNS).

Except as provided in 40 CFR 403.7 any new source subject to this subpart which introduces pollutants into a publicly owned treatment works must comply with 40 CFR part 403 and achieve discharges in accordance with Sec. 414.111.

[58 FR 36892, July 9, 1993]

[Code of Federal Regulations]
[Title 40, Volume 28]
[Revised as of July 1, 2009]
From the U.S. Government Printing Office via GPO Access
[CITE: 40CFR414]

[Page 237-238]

TITLE 40--PROTECTION OF ENVIRONMENT

CHAPTER I--ENVIRONMENTAL PROTECTION AGENCY (CONTINUED)

PART 414_ORGANIC CHEMICALS, PLASTICS, AND SYNTHETIC FIBERS--
Table of Contents

The provisions of this subpart are applicable to the process wastewater discharges resulting from the manufacture of the OCPSF products and product groups defined by Sec. 414.11 from any point source that uses end-of-pipe biological treatment or installs end-of-pipe biological treatment to comply with BPT effluent limitations.

Sec. 414.91 Toxic pollutant effluent limitations and standards for direct discharge point sources that use end-of-pipe biological treatment.

(a) Any point source subject to this subpart must achieve discharges not exceeding the quantity (mass) determined by multiplying the process wastewater flow subject to this subpart times the concentrations in the following table.

(b) In the case of chromium, copper, lead, nickel, zinc, and total cyanide, the discharge quantity (mass) shall be determined by multiplying the concentrations listed in the following table for these pollutants times the flow from metal-bearing waste streams for the metals and times the flow from cyanide bearing waste streams for total cyanide. The metal-bearing waste streams and cyanide-bearing waste streams are defined as those waste streams listed in Appendix A of this part, plus any additional OCPSF process wastewater streams identified by the permitting authority on a case-by-case basis as metal or cyanide bearing based upon a determination that such streams contain significant amounts of the pollutants identified above. Any such streams designated as metal or cyanide bearing must be treated independently of other metal or cyanide bearing waste streams unless the permitting authority determines that the combination of such streams, prior to treatment, with the Appendix A waste streams will result in substantial reduction of these pollutants. This determination must be based upon a review of relevant engineering, production, and sampling and analysis information.

	Effluent limitations BAT and NSPS \1\

Effluent characteristics	Maximum for any one day	Maximum for any monthly average
Acenaphthene	59	22
Acenaphthylene	59	22
Acrylonitrile	242	96
Anthracene	59	22
Benzene	136	37
Benzo(a)anthracene	59	22
3,4-Benzofluoranthene	61	23
Benzo(k)fluoranthene	59	22
Benzo(a)pyrene	61	23
Bis(2-ethylhexyl) phthalate	279	103
Carbon Tetrachloride	38	18
Chlorobenzene	28	15
Chloroethane	268	104
Chloroform	46	21
2-Chlorophenol	98	31
Chrysene	59	22
Di-n-butyl phthalate	57	27
1,2-Dichlorobenzene	163	77
1,3-Dichlorobenzene	44	31
1,4-Dichlorobenzene	28	15
1,1-Dichloroethane	59	22
1,2-Dichloroethane	211	68
1,1-Dichloroethylene	25	16
1,2-trans-Dichloroethylene	54	21
2,4-Dichlorophenol	112	39
1,2-Dichloropropane	230	153
1,3-Dichloropropylene	44	29
Diethyl phthalate	203	81
2,4-Dimethylphenol	36	18
Dimethyl phthalate	47	19
4,6-Dinitro-o-cresol	277	78
2,4-Dinitrophenol	123	71
2,4-Dinitrotoluene	285	113
2,6-Dinitrotoluene	641	255
Ethylbenzene	108	32
Fluoranthene	68	25
Fluorene	59	22
Hexachlorobenzene	28	15
Hexachlorobutadiene	49	20
Hexachloroethane	54	21
Methyl Chloride	190	86
Methylene Chloride	89	40
Naphthalene	59	22
Nitrobenzene	68	27
2-Nitrophenol	69	41
4-Nitrophenol	124	72
Phenanthrene	59	22
Phenol	26	15
Pyrene	67	25
Tetrachloroethylene	56	22
Toluene	80	26

Total Chromium	2,770	1,110
Total Copper	3,380	1,450
Total Cyanide	1,200	420
Total Lead	690	320
Total Nickel	3,980	1,690
Total Zinc \2\	2,610	1,050
1,2,4-Trichlorobenzene	140	68
1,1,1-Trichloroethane	54	21
1,1,2-Trichloroethane	54	21
Trichloroethylene	54	21
Vinyl Chloride	268	104

\1\ All units are micrograms per liter.

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\2\ Total Zinc for Rayon Fiber Manufacture that uses the viscose process and Acrylic Fiber Manufacture that uses the zinc chloride/solvent process is 6,796 [micro]g/l and 3,325 [micro]g/l for maximum for any one day and maximum for monthly average, respectively.

[52 FR 42568, Nov. 5, 1987, as amended at 58 FR 36892, July 9, 1993]

ATTACHMENT K

Draft Permit Owner Comments and Responses

DuPont Teijin Films

HOPEWELL SITE
DISCOVERY DRIVE
PO BOX 411
HOPEWELL VA 23860
USA

May 12, 2011

Emilee Carpenter
Water Permit Writer, Senior
Department of Environmental Quality
4949-A Cox Road
Glen Allen, VA 23060

Re: Comments regarding draft VPDES Permit VA0003077

Dear Ms. Carpenter:

DuPont Teijin Films – Hopewell Plant (DTF) would like to thank you and DEQ staff for meeting with us on May 3, 2011, to discuss comments and concerns that DTF has regarding the draft permit submitted to Joe Bourne for review on April 20, 2011. As we discussed in the meeting, DTF offers the following comments for your consideration:

1. Draft NPDES Permit Section A Limitations and Monitoring Requirements - Outfall 101 OCPSF Mass Limitations Flow Basis. (Page 101 draft NPDES permit and page 8 of the draft fact sheet)

The current NPDES permit OCPSF limitations are based on an effluent flow of 48,000 gpd. The basis for the 48,000 gpd day flow rate to calculate the NPDES permit limitations can be found in the DTF March 2006 NPDES permit reissuance fact sheet. The fact sheet states "Although the 30 day-maximum flow was determined to be 39,800 gpd using DMR data, a flow of 48,000 gpd was retained in the draft permit. This flow value was retained in response to the facility's request to maintain the 48,000 gpd loading values in order to not be penalized for practicing flow conservation measures reflected in the DMR data as well as planned future expansions."

DTF has continued to practice flow conservation measures which have resulted in additional flow reduction over the past 28 years. A summary of flow data is as follows:

1993	48,000 gpd
1998	44,500 gpd
2005	39,800 gpd
2010	35,700 gpd

The reduction in flows has increased BOD and TSS loads per pound of resin production to the wastewater treatment system. However DTF wastewater treatment facility has maintained a 98%+ BOD5 removal rate across the wastewater treatment system.

DTF requests that VADEQ not penalize the site by reducing the flow used to calculate the OCPSF permit limitations and that VADEQ continue to use the 48,000 gpd flow rate as the basis for OCPSF limitations. If VADEQ cannot provide a flow basis of 48,000 gpd, DTF requests a 3-year compliance schedule to achieve compliance with the new OCPSF-based permit limitations. The compliance schedule would consist of the following:

0 - 6 months - Wastewater Characterization Data
6 - 18 months - Wastewater Treatment Technology Assessment and Pilot Scale Study (If needed)
18 - 36 months - Design, Permitting and Construction of Wastewater Treatment System.

2. Draft NPDES Permit Section C Other Requirements 18. Form 2F Sampling - VADEQ requests stormwater sampling for acetaldehyde, carbaryl, 2,4-D, formaldehyde, isopropanolamine and xylene for the stormwater outfalls.

The form 2F Stormwater NPDES permit instructions for Table 2F-4 states "For each outfall, list any pollutant in Table 2F-4 that you know or believe to be present in the discharge and explain why you believe it to be present. No analysis is required, but if you have analytical data, you must report them." These five pollutants are believed to be present on site, but no analysis for them was performed; therefore, no analytical data was reported.

Based on our discussion at the meeting of May 3, 2011, and the above information, DTF requests that this condition be removed.

3. Draft NPDES Permit Section D Toxics Management Program 1. Biological Monitoring a. VADEQ specifies annual acute tests for outfall 001 for *ceriodaphnia dubia* and *Pimephales promelas* based the fact sheet attachment G WET testing evaluation.

VADEQ's basis for the annual acute toxicity testing requirement is because neither *ceriodaphnia dubia* nor *Pimephales promelas* demonstrated 100% survival in 100% effluent over the course of the current permit. DTF believes that the acute toxicity data does warrant the removal of *Pimephales promelas* for continued monitoring.

A summary of the data presented in attachment G follows. Four of the five acute toxicity tests demonstrated 100% survival in 100% effluent. One acute toxicity test results demonstrated 95% survival in a 100% effluent.

Test Date	Organism	LC50	Percent Survival in 100% Effluenlt
January 2006	*Pimephales promelas*	>100	100
April 2007	*Pimephales promelas*	>100	100
January 2008	*Pimephales promelas*	>100	95
April 2009	*Pimephales promelas*	>100	100
April 2010	*Pimephales promelas*	>100	100

4. Draft NPDES Permit Section A. Limitations and Monitoring Requirements - Outfall 002 and 003 - VADEQ specifies annual storm water monitoring

As discussed in our meeting and in previous correspondence, storm water outfalls 002 and 003 diverts the storm water to outfall 901 (001) under normal storm water events. A significant rainfall event is needed for a discharge to occur from these outfalls. In the past no storm water has exited from outfalls 002 and 003 over a year. Thus, as discussed at the meeting DTF will identify in its Storm Water Management plan that the site will sample the diverted water for outfall 002 and 003 for storm water management evaluations for the parameters specified.

Should you have any questions regarding any of these comments, please feel free to contact me at 804-530-9831. I look forward to hearing from you soon.

Sincerely,

Marianne Andrews

Marianne Andrews
Environmental Engineer

COMMONWEALTH of VIRGINIA

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Douglas W. Domenech
Secretary of Natural Resources

David K. Paylor
Director

Michael P. Murphy
Regional Director

May 25, 2011

Marianne Andrews
Environmental Engineer
DuPont Teijin Films
Marianne.R.Andrews@usa.dupont.com

Re: VA0003077 - Response to Owner Comments on the Draft Permit

Dear Mrs. Andrews,

Thank you for submitting comments on the subject draft permit. Your comments were received at the Piedmont Regional Office on May 13, 2011. DEQ offers the following responses:

1) As discussed in our meeting May 3, 2011, we cannot provide a flow basis of 48,000 gpd. As an alternative, DuPont Teijin Films (DTF) requested a three year compliance schedule to achieve compliance with the new OCPSF-based permit limitations. A compliance schedule for Federal Effluent Guidelines was established in the Code of Federal Regulations (40CFR Part 125.3). The ultimate compliance date was March 31, 1989. Consequently, DEQ cannot provide a compliance schedule in the permit that is consistent with the Federal Regulation. Therefore, permitting staff have coordinated with the enforcement division of the DEQ to establish a special consent order concurrent with permit issuance that will allow the requested three years schedule to achieve compliance. If you wish to discuss the special consent order in more detail, please contact Gina Pisoni at 804-527-5156 or Gina.Pisoni@deq.virginia.gov.

2) Part I.C.18 of the draft permit requires storm water samples for five parameters that were noted on the application but not sampled and analyzed. As indicated in your letter, the Form 2F instructions state that "no analysis is required." Furthermore, Whole Effluent Toxicity testing required at Outfalls 901 and 004 should indicate whether further evaluation of these storm water constituents is warranted. This condition has been removed from the permit in its entirety.

3) Part I.D. of the permit assigns biological monitoring for Outfall 001. Continued annual acute toxicity testing for *Pimephales promelas* was assigned in the draft permit because one of the five tests did not demonstrate 100% survival in 100% effluent. The January 2008 test resulted in a 95% survival in 100% effluent. One of the requirements of test validity is greater than or equal to 90% survival in the control sample. Consequently, it is recognized that the 5 % mortality observed in the 2008 100% effluent sample is not inherently an indication of toxicity for *Pimephales promelas*. Therefore, the WET test results from January 2006 through April 2010 sufficiently establish a lack of toxicity for *Pimephales promelas* and monitoring may be discontinued in this cycle. Should anything change that would affect effluent characteristics, acute tests with *Pimephales promelas* should resume in addition to the acute tests with *Ceriodaphnia dubia*. The draft permit has been modified to remove the toxicity testing requirement for *Pimephales promelas*.

4) DEQ acknowledges and supports DTF's plan to establish new points of compliance for storm water sampling at Outfalls 002 and 003 in the Storm Water Pollution Prevention Plan. Under normal flow conditions and storm events less than approximately 3" per hour, Outfalls 002 and 003 are diverted by drop inlet to discharge through Outfall 901. Because capturing a discharge sample at Outfalls 002 and 003 during extreme weather events may be difficult, DTF has proposed collecting the samples prior to diversion of the storm water via drop inlet. Relocation of the point of compliance does not affect the permittee's authorization to discharge.

The revised draft permit is enclosed for your review. Please respond to the DEQ Piedmont Regional Office within 14 days of this letter with additional comments or concurrence on the draft permit. If you have any questions, you may contact me at 804-527-5072 or Emilee.Carpenter@deq.virginia.gov.

Sincerely,

Emilee Carpenter
Water Permit Writer, Senior

Enclosure: VA0003077 Draft Permit

cc: Bart Ruiter

DuPont Teijin Films

HOPEWELL SITE
DISCOVERY DRIVE
PO BOX 411
HOPEWELL VA 23860
USA

June 8, 2011

Emilee Carpenter
Water Permit Writer, Senior
Department of Environmental Quality
4949-A Cox Road
Glen Allen, VA 23060

Re: Comments regarding draft VPDES Permit VA0003077

Dear Ms. Carpenter:

DuPont Teijin Films – Hopewell Plant (DTF) received your response to our comments and the revised draft, above-referenced permit on May 25 and offers the following, additional comments for your consideration:

1. DTF requests the removal of the whole effluent toxicity screening requirement from stormwater outfalls 901 and 004. The WET testing is an overly conservative approach to assessing any potential stormwater impact to the James River and not representative of actual conditions. The VADEQ water quality standard is based on a one-hour exposure period; the WET screening testing utilizes a 48-hour exposure period for *ceriodaphnia dubia* and a 96-hour exposure period for *Pimephales promelas*. Storm events are typically 2-4 hours in length, with a continual rainfall of 48 to 96 hours rarely, if ever, occurring. The comparison of an actual 4-hour stormwater sample exposure period to a 100% stormwater at a 48- and 96-hour test exposure is incommensurable. In addition the acute mixing zone for outfall 001 provides sufficient dispersion in the river equating to 83:1 dilution, which is not reflected in the acute WET screening test.

2. DTF requests the language in the NPDES Permit (Page 16 of 30) under D. Toxics Management Program 1. Biological Monitoring b. "The test dilutions should be able to determine compliance with an acute LC50 = 5% equivalent to a TUa of = 20" be modified to state the following: "The test dilutions should be able to ~~determine compliance with~~ assess effluent toxicity at an acute LC50 = 5% equivalent to a TUa of = 20."

DTF appreciates DEQ's consideration of these requests. Should you have any questions regarding these comments, please feel free to contact me at 804-530-9831. I look forward to hearing from you soon.

Sincerely,

Marianne Andrews

Marianne Andrews
Environmental Engineer

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July 13, 2011

Marianne Andrews
DuPont Teijin Films
Marianne.R.Andrews@usa.dupont.com

RE: VPDES Permit No. VA0003077, Response to 2nd round owner comment on the draft permit

Dear Ms. Andrews:

Thank you for the second set of owner comments on the subject draft permit. Your comments were received by email June 8, 2011 and subsequently in hard copy on June 9, 2011. We have considered your comments and offer the following responses listed in the order the comments were presented in your letter:

1) As documented in Part 16 of the draft FS, the storm water at Outfalls 901 and 004 demonstrate reasonable potential to exceed instream acute aquatic water quality standards. This evaluation was conducted in accordance with current agency policy as documented in GM10-2003. The aquatic water quality standards are developed to protect against aquatic toxicity, so exceedance of the standards suggests that there is potential for toxicity to aquatic life. DEQ does not have any empirical data to indicate whether or not the storm water at Outfalls 901 and 004 contribute to in stream toxicity. Consequently, the whole effluent toxicity screening in Part I.E.1.b will be retained in the draft permit. Please note that Part I.E.1.d of the permit allows for petition to waive the toxicity screening after four consecutive quarters with no exceedances of the comparative values.

2) Although the language in the original draft permit reflects the boilerplate language applied in all VPDES permits, DEQ staff is amenable to revising the language in Part I.D1.b as requested.

The revised draft permit and fact sheet are attached for your review as are the comments received June 9, 2011. Please respond with further comments or concurrence within 14 days of receipt of this letter. If you have any questions about the permit, please contact me at (804) 527-5072 or emilee.carpenter@deq.virginia.gov.

Sincerely,

Emilee Carpenter
Water Permit Writer

Enclosure: Draft Permit, Draft Fact Sheet, 2nd Owner Comment (6/9/11)

cc: Bart Ruiter, J-BART.RUITER@USA.dupont.com